List of System Mechanisms in the NAS Architecture 5 database

Grouped by Domain

Domain: Air Traffic Control Automation

Application

Mechanism: Aircraft Target Identification System (ATIDS) [2362]

Aircraft Target Identification System (ATIDS) provides a low cost system to monitor runway entrances for incursions and provides notification to the controller. This may be done in the form of a low cost ASDE radar or other means to be determined by investment analysis. ATIDS is a cooperative surveillance technique to observe, resolve, and identify aircraft and ground-service vehicles on and near an airport.", the FAA will fuse data from ATIDS, ASDE-3, ASR-9/ARTS, and ground vehicles equipped with ADS-B. Electromagnetic loops in the airport runways to help track aircraft moving on the ground are also under consideration.

Mechanism: Automated Radar Terminal System Software (ARTS S/W) [2261]

Provides maintenece of the Automated Radar Terminal System Software (ARTS S/W) for ARTS IIE, ARTS IIIA and ARTS IIIE. Functions include radar data processing (RDP), Minimum Safe Altitude Warning (MSAW); controller automated spacing tool, Converging Runway Display Aid (CRDA), Final Approach Monitor (FMS), and other tools to assist the terminal and tower controllers to manage the air traffic in the terminal area.

Mechanism: Automated Radar Terminal System Software Modification (All Purpose Structured Eurocontrol Information Exchange, etc,) (ARTS S/W Mod (ASTERIX, etc)) [2264]

Automated Radar Terminal System Software Modification (All Purpose Structured Eurocontrol Information Exchange (ASTERIX), etc,), (ARTS S/W Mod (ASTERIX, etc)). Modification to the ARTS software that will add capabilities including weather product integration on the displays, processing of ASTERIX formatted surveillance data, improved traffic management and surveillance data processing, Ground-Initiated Communications Broadcast (GICB), and terminal data link functionality.

Mechanism: Center Terminal Radar Approach Control Automation System Build 1 (CTAS Build 1) [176]

Center Terminal Radar Approach Control Automation System Build 1 (CTAS Build 1) includes Traffic Management Unit (TMU) capabilities (timelines, load graphs, automated miles-in-trail, and the situation display) and single center metering using miles-in-trail or time-based scheduling and meter lists on en route displays.

Mechanism: Collaborative Routing and Coordination Tool (CRCT) [2278]

The Collaborative Routing and Coordination Tool (CRCT) consists of the hardware and software required to designate areas of severe weather or congestion as Flow Constrained Areas (FCA), identify flights predicted to enter the FCA, and assess the impact of rerouting flights identified on the en route traffic control center sector loading.

Mechanism: Control by Time of Arrival (CTA) [734]

The Control by Time of Arrival (CTA) mechanism allows the use of arrival rather than departure-based rules, giving the National Airspace System (NAS) users more control over scheduling their own aircraft.

Mechanism: Controller Automation Spacing Aid (CASA) [753]

The Controller Automation Spacing Aid (CASA) is a Decision Support Tool that assists controllers merge arriving traffic from different paths into a single final approach sequence.

Mechanism: Converging Runway Display Aid (CRDA) [752]

The Converging Runway Display Aid (CRDA) is a decision support tool that assists controllers merge arriving traffic into a final approach sequence. CRDA is used at airports with converging runways that have straight-in approaches.

Mechanism: Critical Telecommunications (Critical Telecom) [1396]

Critical Telecommunications (Critical Telecom) is a telecommunications sustaining engineering program that satisfies the need for real-time telecommunications additions, moves, and changes that are largely unpredictable. Critical Telecommunications implements new telecommunications equipment at Air Route Traffic Control Center (ARTCC) installations and provides for equipment testing, training, and program management.

Mechanism: Departure Spacing Program (DSP) [2274]

The Departure Spacing Program (DSP) provides information (recommended departure time, etc.) to controllers to allow for sequenced departures from multiple airports in the New York, Boston and Washington D.C. metropolitan areas. DSP utilizes graphical user interfaces and near real-time electronic information exchange to evaluate aircraft flight plans, model projected aircraft demand, and provide departure window times to controllers at participating airports. The result is to eliminate or reduce contention for airspace at terminal-enroute terminal boundary and departure fix points.

Mechanism: Direct-To (D2) [831]

Direct-To (D2) is a tool designed to assist En Route Controllers in identifying aircraft that can have their en route flight time reduced by flying directly to a downstream point closer to the destination airport. D2 also provides conflict probe, trial planning, and flight plan amendment capabilities for Radar Associate Controllers.

Mechanism: Dynamic Ocean Track System (DOTS) [224]

Provides, as part of the oceanic traffic planning system (OTPS), track generation and traffic display.

Update: You may see the term DOTS still being used for the ocean tracking system. This system is now upgraded/ incorporated into the DOTS Plus. See that mechanism description for more current information.

Mechanism: Dynamic Ocean Tracking System Plus (DOTS Plus) [650]

The Dynamic Ocean Tracking System Plus (DOTS Plus) automation system is located in each of the three Oceanic ARTCCs (Anchorage, Oakland, and New York) and in the ATCSCC. DOTS permits airlines to save fuel by flying random routes, in contrast to structured routes, and permit the air traffic controller to achieve lateral spacing requirements more efficiently. DOTS generates flexible oceanic tracks that are optimized for best airspace utilization and best time/fuel efficiency. Flexible tracks are updated twice a day using forecast winds aloft and separation (vertical and lateral) requirements. The DOTS oceanic traffic display gives a visual presentation of tracks and weather. DOTS sends traffic advisories and track advisories to users and receives aircraft progress reports from the commercial communications service providers. These external data exchanges are achieved through interfaces with the National Airspace Data Interchange Network (NADIN) Packet Switch Network (PSN) for Position Reports, Air Traffic Management (ATM) messages, Pilot Reports (PIREPS), and the Anchorage FDP2000. An interface to the Enhanced Traffic Flow Management System (ETMS) will improve coordination between the oceanic and domestic Traffic Flow Management (TFM) systems/activities. The DOTS Weather Server, installed at the Air Traffic Control System Command Center (ATCSCC), receives National Weather Service (NWS) wind and temperature data via the WARP/WINS system. The weather data is then distributed to the ARTCCs via commercially provided Integrated Services Digital Network (ISDN) telephone lines. DOTS Plus supports separation reduction initiatives as stipulated in RNP-10 (Required Navigation Performance) for decreasing lateral separation from 100 nautical miles to 50 nautical miles.

Mechanism: En Route Software (ER S/W) [2366]

En Route Software (ER S/W) resides on the Host Computer System (HCS). The software provides the functions required to safely and efficiently monitor and manage air traffic in the en route domain. Functionality includes: radar data processing, flight data processing, target acquisition and tracking, "handoff" execution, FDIO, etc. Problem Trouble Reports (PTRs) and NAS Change Proposals (NCPs) to the current software are resolved through incremental software releases at approximately 18 month intervals. All such resolutions are reviewed and approved through the Fielded Automation Requirements Management (FARM) Team, which is the control board for En Route resources. This basic JOVIAL/BAL software was first instantiated in the very early 1970""s and has been continuously modified since that time.

Mechanism: Enhanced Traffic Management System (ETMS) [2077]

The Enhanced Traffic Management System (ETMS) application is at the heart of the Traffic Flow Management (TFM) system, and through it flows the network of all TFM interfaces. ETMS at the Command Center deals with the strategic flow of air traffic at the national level. ETMS at remote facilities is used for local airspace management within the local facility''s own area of responsibility. To facilitate coordination between the Traffic Management Coordinators (TMC) at remote Traffic Management Units (TMUs) and the Traffic Management Specialists (TMS) at the Air Traffic Control System Command Center (ARTSCC), each local ETMS may can also view the national composite picture of traffic for which the Command Center has responsibility. ETMS enables TMS and TMC personnel to track and predict traffic flows, analyze effects of ground delays or weather delays, evaluate alternative routing strategies, and plan traffic flow patterns.

The ETMS central hub is located at the Volpe National Transportation System Center. The hub collects flight schedules, and revisions, from NAS users, and collects actual traffic situation updates from local ETMS TMUs, and combines these with planned traffic initiatives (e.g., Ground Delay Programs) to generate an Aggregate Demand List (ADL) that is output to users every five (5) minutes. The ADL contains predicted arrival and departure traffic at individual airports. NAS users, e.g., air carriers, can access the ADL data to plan and revise their flight schedules to work more efficiently with planned traffic initiatives. This interactive process of flight planning gives users more input to TMCs on how traffic initiatives will affect them and is the heart of the Collaborative Decision Making (CDM) process.

Traffic Management Units (TMUs) are located throughout the NAS amd perform local flow control management functions. TMUs exist in all Air Route Traffic Control Centers (ARTCCs), 35 high activity Terminal Radar Approach Control (TRACONs), 8 Air Traffic Control Towers (ATCTs), 3 Center Radar Approach (CERAP) facilities, and the WJHTC. TMU hardware suites are automated workstations that include computer entry/readout devices, network communications, Flight Strip Printer (FSP), and a Traffic Situation Display (TSD).

NAS users are responsible for providing their own connectivity to the ETMS hub. The various connective user networks are collectively referred to as the CDM Network (CDMnet) which provides two-way connectivity to ETMS. Non-FAA users do not have access to all ETMS data and processing tools.

Mechanism: Enhanced-Advanced Technologies and Oceanic Procedures (E-ATOP) [6312]

E-ATOP will provide and manage automation and information to control Oceanic air traffic. E-ATOP will facilitate seamless aircraft transitions and data transfers between domestic and oceanic airspace.

Mechanism: Final Monitor Aid (FMA) [68]

The Final Monitor Aid (FMA) provides controllers the ability to control multiple simultaneous approaches to parallel runways under instrument flight rule (IFR) conditions by providing increased definition for maintaining aircraft separation. The FMA is installed at the Denver International Airport. The FMA system extracts data from the Automated Radar Terminal System (ARTS) and processes this data for display on the FMA displays.

Mechanism: Flight Data Management - Air Traffic Control System Command Center (FDM - ATCSCC) [516]

The Flight Data Management for Air Traffic Control System Command Center (FDM -ATCSCC) provides the national control center portion of a fully distributed flight data processing capability, using the initial flight object, which includes existing flight plan information and trajectory and performance data (preferred routes, runways). Provides data management and data distribution within the ATCSCC facility.

Mechanism: Flight Object Management System - En Route (FOMS - En Route) [6317]

The FOMS is a component of the Standard Automation Platform (SAP). The FOMS processes flight data received from multiple sources via the System Wide Information Management (SWIM) Management Unit. The FOMS also receives track data from the Surveillance Data Processor and associates tracks with flight data, producing the flight object, which is published to SWIM for subscriber use. Flight plan support functionality includes end-to-end profile evaluation in all phases of flight and evaluation against static and dynamic constraints (terrain, obstacles, airspace restrictions, etc.). The FOMS supports flight planning up to 180 days prior to day of flight. A user can access the flight object from initial to closeout in the same manner. The FOMS provides end-to-end flight data management from preflight to post analysis. Ownership of the flight object begins and ends with Traffic Flow Management and transitions during the flight to clearance delivery, ramp, surface, departure, transition to cruise, cruise, transition to arrival, and ramp. Flight data management is based on trajectory, assigned volumes, and "necessary" route structure.

Mechanism: Flight Object Management System - Terminal (FOMS - Terminal) [6316]

The FOMS is a component of the Standard Automation Platform (SAP). The FOMS processes flight data received from multiple sources via the System Wide Information Management (SWIM) Management Unit. The FOMS also receives track data from the Surveillance Data Processor (SDP) and associates tracks with flight data, producing the flight object, which is published to SWIM for subscriber use. Flight plan support functionality includes end-to-end profile evaluation in all phases of flight and evaluation against static and dynamic constraints (terrain, obstacles, airspace restrictions, etc.). The FOMS supports flight planning up to 180 days prior to day of flight. A user can access the flight object from initial to closeout in the same manner. The FOMS provides end-to-end flight data management from preflight to post analysis. Ownership of the flight object begins and ends with Traffic Flow Management and transitions during the flight to clearance delivery, ramp, surface, departure, transition to cruise, cruise, transition to arrival, and ramp. Flight data management is based on trajectory, assigned volumes, and "necessary" route structure.

Mechanism: Flight Plan Pre-Processor (FPPP) [6330]

The FPPP will permit airlines to submit trial plans for evaluation up to 24 hours in advance, as well as providing early intent FPs to improve the predictive accuracy of ETMS traffic flow models by providing more accurate routing data to ETMS earlier in the planning process. FPPP will also simulate a capability to accept flight plans to be filed, which will be forwarded to the respective NAS Host. This capability will permit the filing of flight plans to a single destination, instead of to the 20 NAS Host systems. FPPP is being developed as a significant step in a multi-phased approach aimed at providing airlines with analytical tools to support flight plan preprocessing.

Mechanism: Flight Schedule Analyzer (FSA) [2367]

The Flight Schedule Analyzer (FSA) consists of post analysis (PA) and real-time (RT) components. PA FSA graphically shows data and analysis results on how well a Ground Delay Program (GDP) performed and what factors affected performance. RT FSA generates a collection of reports that allow the specialists at Airlines and the Air Traffic Control System Command Center (ATCSCC) to monitor GDPs of specific flights as they are executing. Real-time FSA may also be used to monitor "Pop Ups" (flights for which ETMS has no scheduling data) to airports. Airlines use FSA data to internally address situations to assess the effectiveness of GDP and to improve demand predictions. RT FSA is accessible from the ATCSCC intranet web page and generates reports including: (1) Performance, (2) Flight Status, (3) Compliance, (4) Cancelled flights that operated, (5) Pop-up flights, (6) Time-out delayed flights, and (7) GDP Program events.

Mechanism: Flight Schedule Monitor (FSM) [2277]

The Flight Schedule Monitor (FSM) is the main tool for the traffic management specialist at the Air Traffic Control System Command Center (ATCSCC) to monitor, model, and implement Ground Delay Program (GDP) operations. FAA and airlines use FSM to monitor demand through receipt of FSM demand pictures of airports updated every 5 minutes. FSM constructs "what if" scenarios for best options (i.e., best parameters) prior to making a GDP decision. Modeling may be used by: (1) the ARTCC TMC to request ATCSCC implementation of a GDP in the event of significant congestion or if a demand/capacity imbalance is projected at an en route fix, route, or sector; (2) the ATCSCC to determine ARTCC start/end times, Airport Arrival Rate (AAR), and other paramters for a particular GDP scenario; and (3) the Airlines to see the effects of cancelling or delaying a specific flights under a GDP.

Reports from the FSM modeling tool for each GDP include: (1) Carrier Statistics showing total minutes of delay for each flight, (2) Airborne Holding Flight Lists of arrival slots, (3) FSM Slot list, (4) Surface Delay histograms, (5) CTA Compliance Alarms for violations of Arrival compliance, (6) CTD Compliance Alarms for violation of Departure compliance, (7) ETEs on significant differences between actual vs ETMS estimated times, and (8) Spurious Flight Alarms triggered upon cancellation of false flights in a substitution stream.

Mechanism: Flight Schedule Monitor Enhancements (FSM Enhanced) [735]

Flight Schedule Monitor Enhanced (FSM Enhanced) augments the existing FSM system by incorporating distance-based Ground Delay Programs (GDP), multiple-fix GDPs, airport GDPs, and playbook-based GDPs. Playbook refers to the National Playbook, which is a collection of Severe Weather Avoidance Plan (SWAP) routes that are pre-validated and coordinated with impacted Air Route Traffic Control Centers (ARTCCs). It is designed to mitigate the potential adverse impact to users and the FAA during periods of severe weather or other events that affect the NAS.

Mechanism: Ground Delay Program Enhancements (GDPE) [725]

Ground Delay Program Enhancements (GDPE) provides the following functionality: (1) A capability for both the FAA and airlines to exchange airline schedule changes in both real-time and days in advance of being effective; (2) A new ground delay program algorithm, Ration by Schedule, to eliminate penalties that were a disincentive to airlines who submitted schedule changes earlier than existing procedures allowed; (3) The same situational awareness of traffic problems to both the FAA and the airlines

Mechanism: National Airspace System Status Information (NASSI) [726]

National Airspace System Status Information (NASSI) is a database that provides FAA and NAS users a common view of the system status and safety information they require for shared situational awareness and effective traffic flow management decision making.

Mechanism: National Airspace System Status Information Expanded (NAS Status Info Expanded) [727]

The National Airspace System Status Information Expanded (NAS Status Info Expanded) provides infrastructure and NAS status data to users. These data includes dynamic Special Use Airspace (SUA). NAS status information deals with increasing the availability of NAS status data to be shared by FAA traffic flow managers and NAS users. Dynamic SUA information allows for increased planning activities associated with free flight when SUA availability is known.

Mechanism: Next Generation Traffic Flow Management (NG-TFM) [6310]

The Next Generation Traffic Flow Management (NG-TFM) system provides an array of automation and data processing tools for Traffic Management Specialists (TMS) and Traffic Management Coordinators (TMC), as well as a gateway that enables NAS users to make changes in flight schedules based on planned traffic initiatives (e.g., Ground Delay Programs) and other NAS data. This enhanced decision support system provides increased information exchange between FAA service providers and NAS users. NG-TFM receives flight schedules from NAS users (e.g., air carriers) and combines these with weather data, NAS status data, and planned traffic initiatives to generate detailed graphical and textual traffic displays as far as 24 hours into the future on both national and local scales. Features include both pre-flight and post-flight analysis tools, flight data archiving, enhanced traffic displays, traffic strategy (one or more initiatives) automation, "what if" strategy analysis, and automated TFM training tools.

NG-TFM is comprised of five different software component systems and will include a hardware and operating system software tech refresh. The complete NG-TFM software package includes changes to support interfaces with the Flight Object Management System (FOMS) and System Wide Information Management (SWIM). When complete, this will establish a new NG-TFM system baseline.

Mechanism: Post Flight NAS Analysis, Increment #1 (Post Flt Assess #1) [802]

The Post Flight NAS Analysis Increment #1 (Post Flt Assess #1) will provide historical information to service providers and users for post-operations analysis and long-range planning. This initial increment addresses information that is available in current systems or with minimal data entry.

Mechanism: Post Operations Evaluation Tool (POET) [2401]

Post Operations Evaluation Tool (POET) is an analysis system that allows users of the National Airspace System (NAS), the Air Traffic Control System Command Center (ATCSCC), Air Route Traffic Control Centers (ARTCC), and other FAA facilities to review the functional status of the NAS and help analyze collaborative routing problems in identifying areas of NAS congestion or inefficiency. A variety of performance metrics (e.g., departure, en route, and arrival delays as well as filed versus actually flown tracks) aid in the analysis.

Mechanism: Probabilistic Flow Management (PFM) [745]

Probabilistic Flow Management (PFM) improves the ability to predict traffic flow by factoring in an understanding of the prediction uncertainties in the decision-making process. This capability will allow the management of the impacts of uncertain demand predictions on TFM decisions.

The capability will be developed under a work package that will parallel the modernization of the TFM Infrastructure. The capability will be tested and implemented in a limited environment and once perfected full integration with the TFM environment will occur under NG-TFM. This capability is a necessary prelude to delivering improved TFM capabilities with NG-TFM.

Mechanism: Sector Design Analysis Tool (SDAT) (SDAT) [6340]

SDAT is an analytic tool that evaluates changes in airspace design and traffic routing. SDAT is a component of the SDAT Enterprise, an FAA-owned decision support tool for analysis and design of airspace and traffic flows. Its primary focus is supporting the activities undertaken by FAA airspace offices at local, regional, and national levels. SDAT applications include airspace visualization, traffic flow analysis, and model integration. The SDAT Enterprise tool suite currently consists of three components: SDAT, the high-end visualization and analysis tool; SDAT Construct, for data and project management; and AT Vista, an ATC display emulator.

Mechanism: Severe Weather Avoidance Program Enhancements (SWAP Enhancements) [736]

The Severe Weather Avoidance Program Enhancements (SWAP Enhancements) mechanism provides the initial severe weather rerouting planning capability. It also provides the weather specialists in the Air Traffic Control System Command Center (ATCSCC) with an automated tool that provides suggested reroutes around severe weather.

Mechanism: Standard Terminal Automation Replacement System Software (STARS S/W) [6350]

The Standard Terminal Automation Replacement System Software (STARS S/W) provides enhanced software capabilities to safely and efficiently monitor and manage air traffic in the terminal domain. Enhancements are provided in 4 general categories as follows: 1. Interface and integration of external systems including: Precison Runway Monitor (PRM), Surface Movement Advisor (SMA), passive Final Approach Spacing Tool (pFAST), Airport Movement Area Safety System (AMASS), Noise Abatement Monitoring (NAM), Automated Barometric Pressure Entry (ABPE), active Final Approach Spacing Tool (aFAST) and Tower systems.

2. Surveillance Data Processing (SDP) enhancements including: SDP Upgrades that enhance precision and accuracy, data transfer using the ASTERIX protocol, Automatic Dependent Surveillance (ADS-B) integration, ADS-B applications (including Surface Conflict Probe), safety function enhancements to Conflict Alert (CA) and Minimum Safe Altitude Warning (MSAW), and Ground Initiated Communications Broadcast (GICB).

3. Flight Data Processing (FDP) Enhancements including: STARS to STARS interfacility and STARS FDP upgrades.

4. Funtional Enhancements including: Free Form Text, TCP Defined Airspace, Local Information Service (LIS) and Integrated Terminal Weather System (ITWS) data displayed on controller displays.

Mechanism: Surveillance Data Processor (SDP) [6320]

SDP is a component of SAP and operates in En Route and Terminal. The SDP will make improvements to sensors and automation systems that will allow for expanded use of 3-mile separation and terminal procedures. The operational improvements enable more efficient control of aircraft and use of airspace. To accomplish this, all 1030/1090 Beacon interrogators will be upgraded to disseminate their existing 1.2 milli-radian azimuth accuracy and other information, such as time of measurement, confidence, quality, and so on. The automation system algorithms will be improved or new algorithms will be developed to exploit the additional information content of the improved surveillance reports. The method of presentation (display) to support 3-mile separation will be developed and tested to ensure safety. The existing long-range sensor surveillance update period is (12 seconds) and is insufficient to support 3-mile separation. In areas where only long-range sensors exist and where the Air Traffic Service requires 3-mile separation, these sensors may be modified to double the update rate to achieve 3-mile separation.

Mechanism: Traffic Flow Management System Applications Upgrade (TFM Applications Upgrade) [6331]

Traffic Flow Management System Applications Upgrade (TFM Applications Upgrade) will be an integrated system used by traffic management specialists and coordinators to track and predict traffic flows; analyze effects of ground or weather delays; evaluate alternative routing strategies; improve collaborative decision making among users; plan traffic flow patterns; and assess daily and long term traffic flow performance in the National Airspace System (NAS) to better balance capacity and demand requirements for all users. Using the current Enhanced Traffic Flow Management System (ETMS) functionality as a baseline, this mechanism will evolve to a new open systems software architecture. This new architecture is expected to lower the life cycle cost of software maintenance, the development/integration of existing and future functionality and capabilities, and interface to other domain automation systems. This upgrade will facilitate new functionality and integrate existing TFM standalone subsystems and prototypes such as POET, TM Log, ESIS, DSP, etc. and improve the human computer interface (HCI).

Mechanism: Traffic Management Advisor Display (Free Flight Phase 1) (TMA Display (FFP1)) (TMA Display (FFP1)) [2031]

The Traffic Management Advisor Display (Free Flight Phase 1) (TMA Display (FFP1)) is located at the Traffic Management Unit (TMU) and displays two views: The Timeline Graphical User Interface (TGUI) (TMA timeline data), and the Plan Graphical User Interface (PGUI) (Plan View Display).

Separate from the TMA Display in the TMU, TMA meter list data is passed from the TMA workstation to Host for display on the Display System Replacement (DSR) console.

Mechanism: Traffic Management Advisor Multi-Center Prototype (TMA MC Prototype) [2286]

The Traffic Management Advisor Multi-Center Prototype (TMA MC Prototype) mechanism is designed, integrated and deployed by NASA to the Northeast Centers plus the TRACON at Philadelphia. The MC retains the functions of a TMA SC stand-alone mechanism, but the MC mechanism provides the additional capability to share data between facilities for automation and collaboration. In addition to each Center''s TMA processor receiving data directly from their respective Host, they also exchange data via a TMA network with each other.

Each TMA within the MC network has a defined role, and each functions as either the Controlling, the Arrival, or the Adjacent Center TMA (or any combination thereof). The Controlling Center TMA controls the Dynamic Planner scheduler, which generates Scheduled Times of Arrival (TOA). The Arrival Center controls the meter fix that feeds the aircraft into the TRACON and airport. The Adjacent Center feeds aircraft into the Controlling and Arrival Centers. In effect, TMA MC extends the aircraft prediction and controllability horizon into upstream Centers to prevent congestion or contention on arrival paths.

Mechanism: Traffic Management Advisor Single Center (Free Flight Phase 1) (TMA SC (FFP1)) [593]

Traffic Management Advisor Single Center (Free Flight Phase 1) (TMA SC (FFP1)) computes flight arrival sequencing, scheduled time of arrival (STA), and estimated time of arrival (ETA) at various points along the aircraft flight path to an airport. These points include an outer meter arc, the meter fix, the final approach fix, and runway threshold. In response to changing events and controller inputs, TMA-SC provides results to the en route sector team to maintain optimum flow rates to runways. It does this by providing continual updates of meter fix STA and delay information at a speed comparable to the live radar update rates. The team defines maneuvers and issues clearances so aircraft cross the meter fixes at the STA. Since TMA-SC calculates a schedule for arriving aircraft to meet Terminal Radar Approach Control Facility (TRACON) acceptance rates set by Traffic Management Specialists (TMSs), selected airports must be the basis for a TMA-SC deployment plan. TMA also maintains statistics on the traffic flow and the efficiency of the airport and displays them to TMSs.

FFP1 deploys TMA SC to 7 sites and is followed by FFP2, which adds 4 more sites. Software at the FFP1 locations will be upgraded during FFP2 for consistentcy and commonality with the systems being deployed to the FFP2 locations.

Mechanism: Traffic Management Advisor Single Center Free Flight Phase 2 (TMA SC (FFP2)) [701]

Traffic Management Advisor Single Center (Free Flight Phase 2) (TMA SC (FFP2)) is similar to TMA SC FFP1. It computes flight arrival sequencing, scheduled time of arrival (STA), and estimated time of arrival (ETA) at various points along the aircraft flight path to an airport. These points include an outer meter arc, the meter fix, the final approach fix, and runway threshold. In response to changing events and controller inputs, TMA-SC provides results to the en route sector team to maintain optimum flow rates to runways. It does this by providing continual updates of meter fix STA and delay information at a speed comparable to the live radar update rates. The team defines maneuvers and issues clearances so aircraft cross the meter fixes at the STA. Since TMA-SC calculates a schedule for arriving aircraft to meet Terminal Radar Approach Control Facility (TRACON) acceptance rates set by Traffic Management Specialists (TMSs), selected airports must be the basis for a TMA-SC deployment plan. TMA also maintains statistics on the traffic flow and the efficiency of the airport and displays them to TMSs.

TMA SC FFP2 adds 4 more ARTCCs and 4 more TRACONS to the 7 ARTCCs and 7 TRACONS deployed under TMA SC (FFP1), giving a total of 22 TMA SCs at 11 ARTCCs and 11 TRACONS.

Mechanism: Traffic Situation Display (TSD) [796]

The Traffic Situation Display (TSD) is a computer system that receives radar track data from Air Route Traffic Control Centers (ARTCCs), organizes this data into a mosaic display, and presents it on a computer screen to monitor any number of traffic situations or system-wide traffic flows. The display allows the traffic management coordinator multiple methods of selection and highlighting of individual aircraft or groups of aircraft. The user has the option of superimposing these aircraft positions over any number of background displays. These background options include ARTCC boundaries, any stratum of en route sector boundaries, fixes, airways, military and other special use airspace (SUA), airports, and geopolitical boundaries.

Mechanism: Unified Decision Management System (UDMS) [6309]

The Unified Decision Making System (UDMS) enhances the Collaborative Decision Making (CDM) process by enabling NAS users and the FAA to share flight schedules, planned traffic initiatives (e.g., Ground Delay Programs), advanced traffic flow predictions, and other NAS data electronically. UDMS upgrades the basic CDM functionality of the TFM-M system hub that connects to user-owned data networks. NAS users gain access to more sophisticated graphical and textual traffic flow predictions, as well as automated planning and analysis tools.

Mechanism: User Request Evaluation Tool Core Capability Limited Deployment (URET CCLD) [307]

The User Request Evaluation Tool Core Capability Limited Deployment (URET CCLD) provides conflict probe capabilities to the data controller display in Air Route Traffic Control Center (ARTCC) facilities. URET combines real-time flight plan and radar track data with site adaptation, aircraft performance characteristics, and winds and temperatures aloft to construct four dimensional flight profiles, or trajectories, for pre-departure and active flights. For active flights, it also adapts itself to the observed behavior of the aircraft, dynamically adjusting predicted speeds, climb rates, and descent rates based on the performance of each individual flight as it is tracked through en route airspace, all to maintain aircraft trajectories to get the best possible prediction of future aircraft positions. URET uses its predicted trajectories to continuously detect potential aircraft conflicts up to 20 minutes into the future and to provide strategic notification to the appropriate sector. URET enables controllers to "look ahead" for potential conflicts through "what if" trial planning of possible flight path amendments. It enables controllers to accommodate user-preferred, off-airway routing to enable aircraft to fly more efficient routes, which reduce time and fuel consumption.

URET CCLD communicates with the controller at the DSR D-position by means of a gateway to the DSR LAN. It obtains flight plan and track data from Host by direct connection, and it obtains wind, temperature and pressure data from WARP WINS by means of a gateway. URET CCLD is deployed to 6 sites and will be expanded to 20 under URET National Deployment (FFP2).

Mechanism: User Request Evaluation Tool National Deployment (URET National Deployment) [687]

The User Request Evaluation Tool National Deployment (URET National Deployment) provides conflict probe capabilities to the data controller display in the Air Route Traffic Control Centers (ARTCC) facilities. URET combines real-time flight plan and radar track data with site adaptation, aircraft performance characteristics, and winds and temperatures aloft to construct four dimensional flight profiles, or trajectories, for pre-departure and active flights. For active flights, it also adapts itself to the observed behavior of the aircraft, dynamically adjusting predicted speeds, climb rates, and descent rates based on the performance of each individual flight as it is tracked through en route airspace, all to maintain aircraft trajectories to get the best possible prediction of future aircraft positions. URET uses its predicted trajectories to continuously detect potential aircraft conflicts up to 20 minutes into the future and to provide strategic notification to the appropriate sector. URET enables controllers to "look ahead" for potential conflicts through "what if" trial planning of possible flight path amendments. It enables controllers to accommodate user-preferred, off-airway routing to enable aircraft to fly more efficient routes, which reduce time and fuel consumption.

The National Deployment deployment of URET adds systems to the remaining ARTCCs and tech refreshes the original systems fielded under URET CCLD. The tech refresh provides additional functionalities. It will also introduce infrastructure changes to synchronize with DSR D-side infrastructure changes (see the DSR Mod (Tech Refresh) mechanism), both of which are driven by future ERAM infrastructure changes. New URET functions include: Alternate Flight Plan Processing; Automatic Assistance Dynamic Rerouting; ICAO flight plan processing; Problem Analysis, Resolution and Ranking; Airspace Redesign; and Tech Refresh. ERAM will replace the URET Fiber Distributed Data Interface (FDDI) LAN infrastructure, the URET Conflict Probe processor, and add a redundant Conflict Probe backup capability.

Mechanism: User Request Evaluation Tool Prototype (URET Proto) [6369]

The User Request Evaluation Tool Prototype (URET Proto) was developed and deployed by MITRE based on early benefits recommended by RTCA. The URET Proto, which pre-dated the HID and URET LANS, was a dedicated computer server that received Host data via a one-way connection from PAMRI and displayed data at a dedicated terminal at the DSR D-position area. It also obtained wind, temperature, and pressure data from the National Weather Service every three hours.

Prior to URET, en route controllers receive approximately three minutes of warning about conflicts from the conflict alert function. The URET prototype resulted in notification no earlier than 20 minutes and no later than 10 minutes before the start of conflict, which added a considerable margin of safety to the system.

LAN

Mechanism: Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) [80]

The Host Interface Device/National Airspace System Local Area Network (HID/NAS LAN) is a two-way high-bandwidth LAN connection to the Host Computer System (HCS) to support co-located outboard processing and processes. The HCS presently supplies real-time surveillance, flight data and other information to several decision support tools housed in co-located outboard processors on the HID/NAS LAN. These decision support tools are the Traffic Management Advisory (TMA) and the Controller-Pilot Data Link Communications (CPDLC). Additionally, these tools take data from the HCS, perform their functions, and provide their outputs to HCS via the HID/NAS LAN. Exchange of data between TMA and HCS is via the HID NAS LAN and the Host ATM Data Distribution System (HADDS), a database system based on the Common Message Set (CMS). Exchange of data between CPDLC and DSR is via HID/NAS LAN and HCS. It is anticipated that the En Route Automation Modernization (ERAM) will replace the HID/NAS LAN.

Processor

Mechanism: Advanced Technologies and Oceanic Procedures (ATOP) [1737]

Advanced Technologies and Oceanic Procedures (ATOP) is a Non-Developmental Item (NDI) automation, communications, training, maintenance, installation, transition, and procedures development support acquisition. It will provide a Flight Data Processing (FDP) capability fully integrated with Surveillance Data Processing (SDP). The SDP will be capable of processing primary and secondary radar, Automatic Dependent Surveillance (ADS, both Addressable: ADS-A and Broadcast: ADS-B), Controller Pilot Data Link Communications (CPDLC) position reports, and relayed High Frequency (HF) radio voice pilot position reports from an HF radio operator employed by a communications service provider under contract to the FAA. ATOP will support radar and non-radar procedural separation, tracking clearances issued via CPDLC or messages through the HF radio service provider, conflict detection/prediction capabilities through the use of controller tools (Conflict Alert and Minimum Safe Altitude Warning for radar airspace and Conflict Probe for non-radar procedural separation applications), and fully automated coordination via Air traffic services Inter-facility Data Communications System (AIDCS) with AIDCS equipped adjacent Flight Information Regions (FIRs) . The ATOP inter-facility data communications system will be capable of supporting the ICAO air traffic services message set. ATOP supports operations in which the information and primary capabilities required for the controller to maintain situational awareness and provide procedural separation services are available on the display (rather than paper flight strips).

Mechanism: Aeronautical Information Management (AIM) [6327]

The AIM system represents the evolution of the acquisition, storage, processing and dissemination of aeronautical information in the NAS. Aeronautical information is defined as any information concerning the establishment, condition, or change in any component (facility, service, or procedure of, of hazard) of the National Airspace System. Aeronautical information comes in two types a somewhat static type, and a more dynamic type. The static portion represents the aeronautical information baseline as a particular date, while the dynamic portion updates particular aspects of the static portion due to system impacts or events. The Static portion represents data that NAS automation systems and other users use to adapt their software to properly operate. The dynamic portion represents information typically contained in NOTAMs that indicate short-term changes to the static data.

Many NAS systems support the acquisition, generation, and dissemination of the static aeronautical information. Information of this type includes airspace structures, airways, locations of NAS facilities, inter-facility letters of agreement and memorandums of understanding, obstructions, standard procedures, airspace charts, etc.

Several NAS systems also support the acquisition, generation, processing, and dissemination of the dynamic aeronautical information. Information of this type includes, facility outages, runway closures, temporary flight restrictions, airspace constraints, SIGMETs, etc. This information must be disseminated to users and providers of air traffic services in a timely and efficient manner.

AIM will provide the central point for the dissemination of high quality, configuration controlled information to NAS systems, service providers and users of the NAS. AIM will disseminate data based on the Aeronautical Information Exchange Model (AIXM) protocols.

Mechanism: Aeronautical Information System Replacement (AISR) [2379]

The Aeronautical Information System (AISR) is a web based replacement system for the obsolete, maintenance intensive, non-Year 2000 (Y2K) compliant Leased A and B service (LABS) GS-200 system. AISR provides a workstation to: (a) process flight plans (file, amend, cancel, store and transmit) including ICAO flight plans, (b) retrieve aeronautical weather from WMSCR, collectives and AIS, and (c) process Notice to Airmen (NOTAM) (collect and distribute). AIS uses FAA IP Routed Multi-user Net (FIRMNet) for access by 60+ flight data (FD) specialists in ARTCCs, 60+ in AFSSs, and 10+ in FAA Regional Offices (ROs). It uses Non-classified Internet Protocol Router Network (NIPRNet) for access by 60+ Military Base Operations (MBOs), dedicated lines for access by 20+ Meteorological Weather Processing Centers and National Airspace Data Interchange Network (NADIN) Packet-Switched Network (PSN) for access to the Weather Message Switching Center Replacement (WMSCR). Alternate access is available via toll free service to a local service provider. The primary AIS server is located in the National Network Control Center (NNCC) Salt Lake City facility and the back-up server is located in Chantilli VA.

Military base operations uses AIS for flight plan input.

Mechanism: Air Traffic Operational Management System (ATOMS) [284]

The Air Traffic Operational Management System (ATOMS) collects and distributes real-time air traffic operational data and management information throughout the National Airspace System (NAS).

Mechanism: Airport Movement Area Safety System (AMASS) [228]

The Airport Movement Area Safety System (AMASS) with Airport Surface Detection Equipment (ASDE) provides controllers with automatically generated visual and aural alerts of potential runway incursions and other potential unsafe conditions. AMASS includes the Terminal Automation Interface Unit (TAIU) that processes arrival data from the airport surveillance radar. AMASS adds an automation enhancement to the ASDE-3 and tracks the movement of aircraft and ground vehicles on the airport surface and presents the data to the tower controllers via the ASDE display.

Mechanism: Automated Radar Terminal System - Model IIA (ARTS IIA) [2310]

The Automated Radar Terminal System - Model IIA (ARTS IIA) provides radar data processing (RDP) and decision support tools to the controller in the terminal environment. Utilized at small Terminal Radar Approach Controls (TRACONs), ARTS IIA is capable of receiving input from one sensors, can process up to 256 tracks simultaneously and support up to 11 displays. The radar data processing (RDP) software provides automated surveillance tracking and display processing. Included in the ARTS IIA software are the decision support tools, minimum safe altitude warning (MSAW) and conflict alert, (CA).

Mechanism: Automated Radar Terminal System - Model IIE (ARTS IIE) [286]

The Automated Radar Terminal System - Model IIE (ARTS IIE) provides radar data processing (RDP) and decision support tools to the controller in the terminal environment. Utilized at low to medium-size Terminal Radar Control (TRACONs) Facilities the ARTS IIE is capable of receiving input from up to 2 sensors, can process up to 256 tracks simultaneously, and support up to 22 displays. The ARTS IIE implements the Common ARTS software for improved performance maintenance efficiency. The radar data processing (RDP) software provides automated surveillance tracking and display processing. Included in the ARTS IIE software are decision support tools such as Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), and Controller Automation Spacing Aid (CASA).

Mechanism: Automated Radar Terminal System - Model IIIA (ARTS IIIA) [1]

The Automated Radar Terminal System - Model IIIA (ARTS IIIA) provides radar data processing (RDP) and decision support tools to the controller in the terminal environment. Utilized at larger airports, ARTS IIIA is capable of receiving input from up to three sensors, can process up to 900 tracks simultaneously and support up to 36 displays. The RDP software provides automated surveillance tracking and display processing. Included in the ARTS IIIA software are decision support tools such as Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), Final Monitor Aid (FMA), and controller automation spacing aid.

Mechanism: Automated Radar Terminal System - Model IIIE (ARTS IIIE) [11]

The Automated Radar Terminal System - Model IIIE (ARTS IIIE) consists of the hardware platform and software required providing radar data processing (RDP) and decision support tools to the controller in the terminal environment. The ARTS IIIE is used at consolidated Terminal Radar Approach Control (TRACON) facilities. The Common ARTS program provided an ARTS IIIE capable of receiving input from up to 15 sensors, the ability to process up to 10,000 tracks simultaneously, and support up to 223 displays. The RDP software provides automated surveillance tracking and display processing including mosaic display of radar data. Included in the ARTS IIIE software are decision support tools such as Minimum Safe Altitude Warning (MSAW), Conflict Alert (CA), Mode C intruder alert, Converging Runway Display Aid (CRDA), Final Monitor Aid (FMA), and controller automation spacing aid.

Mechanism: Consolidated Notice to Airmen System (CNS) [2314]

The Consolidated Notice to Airmen System (CNS) consists of a CNS Processor (CNSP) and Notice to Airmen (NOTAM) workstations. The CNSP collects, processes, and maintains a processed NOTAM database consisting of all NOTAMs on domestic and foreign civilian and military facilities, services, procedures, etc., pertinent to NAS users and specialists; and an international NOTAM database exchanged with and accessible to international agencies. The CNSP provides the capability for processing NOTAMs into a standardized form, maintaining a complete database of the NOTAMs, and the distribution of processed NOTAMs to NAS subsystems and external systems.

Mechanism: Direct Access Radar Channel (DARC) [7]

The Direct Access Radar Channel (DARC) provides a back-up processing path to provide surveillance data to the displays in the event of a primary channel (Host Computer System (HCS) failure. The DARC path is a physically, logically and electrically separate processing path (with diverse hardware and software) from the primary Host Computer System (HCS) Radar Data Processing (RDP) paths. Thus DARC provides a tertiary path, to keep radar data on the controller''s displays, should both HCS RDP paths be disabled for any reason. The DARC provides radar data processing, very limited flight data processing, but with significantly less functionality than the HCS. Basically, DARC serves as a lifeboat should both HCS processing paths become disabled.

Mechanism: Direct User Access Terminal Service (DUATS) [6]

Direct User Access Terminal Service (DUATS) is a vendor-provided service giving pilots convenient access to pre-flight aeronautical and weather information for flight planning. Allows pilots to input instrument flight rules (IFR), international civil aviation organization (ICAO), and visual flight rules (VFR) flight plans into the system.

Mechanism: En Route Automation Modernization (ERAM) [6334]

The En Route Automation Modernization System (ERAM System) will replace the existing diverse but functionally unequal primary and backup channels (Host and DARC) with redundant, functionally equivalent primary and backup channels. The new primary and backup channels achieve identical full functionality by using highly reliable fault tolerant processing elements running identical software. A tertiary system with diverse software, and physical and electronic isolation from the ERAM primary and back-up systems, will be maintained as fall back until the functionality, reliability, and availability of ERAM is demonstrated in the field. A training subsystem with functionality identical to the operational system will permit training to be conducted in parallel with operations.

In the past decade, several functions (URET, CTAS, etc.) were implemented as outboard processors/processes to the Host. As ERAM evolves in successive builds, this functionality will be integrated into ERAM as described below.

ERAM"s enhanced FDP will accommodate flexible routing around congestion, weather, and restrictions and improve efficiency by providing improved traffic flows. The enhanced ERAM surveillance processing will accomodate a larger geographic coverage, increased quantity of radar inputs and, when available, integration of Automatic Dependent Surveillance Broadcast data. In addition ERAM will use the improved accuracy and information disseminated by the sensors using the All-purpose Structured EUROCONTROL Radar Information Exchange (ASTERIX) format.

ERAM will allow for improved performance of decision support tools such as the Enhanced Traffic Management System (ETMS). ERAM will also incorporate Center-terminal radar approach control automation system (CTAS) functions (descent advisor, timelines, load graphs, automated miles-in-trail, and the situation display) and multi-center metering using miles-in-trail or time-based scheduling and meter lists.

ERAM will employ an industry standard LAN-based system to improve the efficiency of integrating commercial-off-the-shelf solutions in the future. ERAM software will be developed using a common high-level language to increase the FAA"s access to market-based skills and lower the cost of development and lifecycle maintenance. ERAM"s design will enable future enhancements and maintenance of components without affecting operational availability and increased productivity from an integrated monitor and control capability.

Mechanism: En Route Monitor and Control (EMAC) [6354]

The En Route Monitor and Control (EMAC) project will consolidate the Monitor & Control (M&C) functions of legacy Air Route Traffic Control Center (ARTCC) systems into open system architecture. It will reduce the size of the area needed for displaying system status of separate systems and provide a common Human Computer Interface (HCI) functionality among them. EMAC will include power system displays and will support prioritization of operational equipment maintenance and restoration efforts along the lines of the classification categories of critical, essential, and routine systems. EMAC will reduce the number of ARTCC M&Cs located in the ARTCC Monitor and Control Center (AMCC)and will be compatible with NIMS, which alternately refers to AMCC as the Systems Operation Center (SOC). EMAC will reduce M&C software development and training costs and, based on use of a common HCI, will ensure uniformity of functions performed by Airway Facilities specialists.

Mechanism: Enhanced Back-up Surveillance (EBUS) [6335]

The Enhanced Back-Up Surveillance (EBUS) system replaces the DARC system in use at the 20 Air Route Traffic Control Centers (ARTCC) in the contiguous United States (CONUS), the William J. Hughes Technical Center (WJHTC), and the FAA Academy (FAAAC). The EBUS design employs the existing FAA-certified software of the Microprocessor En Route Automated Radar Tracking System (Micro-EARTS) application to provide radar data processing (RDP) services for the replacement legacy backup system. Micro-EARTS provides key capabilities not supported by the DARC legacy system it replaces, among which are the safety functions of Conflict Alert (CA), Mode-C Intruder (MCI), and Minimum Safe Altitude Warning (MSAW). EBUS also provides Next Generation Radar (NEXRAD) weather data to R-position users via the DSR Backup Communications Network (BCN). EBUS makes the R-position functionality on the backup channel more comparable to that of the primary channel.

The EBUS software (Micro EARTS) and the ECG backup gateway software will share the same hardware platform such that both software functions will reside in the same ECG backup gateway hardware platform.

Mechanism: Enhanced Traffic Management System - Hardware Upgrade (ETMS - HW Upgrade) [165]

The ETMS HW Upgrade mechanism is a tech refresh of existing equipment and workstations at the Air Traffic Control System Command Center (ATCSCC), Volpe Hub, and Traffic Management Units (TMUs) located at Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control (TRACON) facilities and some Air Traffic Control Towers (ATCTs).

Mechanism: Environmental Remote Monitoring Subsystem (ERMS) [656]

The Environmental Remote Monitoring Subsystem""s (ERMS) function is to monitor and control environmental equipment in a variety of NAS facilities. Some of the facility parameters that are monitored include Fuel Tank Leakage, Facility Door opening, and Engine Generator startup. ERMS performs within the Remote Maintenance Monitoring System (RMMS) of the NAS as a fully functioning, remote monitoring subsystem (RMS). The RMMS interfaces with the Monitor and Control Facility (MCF) and is displayed on the Maintenance Automation System Software (MASS).

Mechanism: FAA Information Superhighway for Training (FIST) [2192]

The FAA Information Superhighway for Training (FIST) is an efficient, secure, platform independent tool with continuous access to Airway Facilities users. Built by the FAA Academy""s Airway Facilities Division (AMA-400), FIST is used as a consolidated centralized site for distributing training information and related resources. The primary purpose of this system is to service Airway Facilities in the following areas: Clip Media Reference, Automated Forms, Courseware Mass Storage, and Airway Facilities Training Bulletin Board. FIST will require a technical refresh from 2008-2011.

Mechanism: Flight Data Processing 2000 (FDP2000) [2000]

The Flight Data Processing 2000 (FDP2000) system replaced the oceanic flight data processing capability provided by Offshore Computer System (OCS) at the Anchorage Air Route Traffic Control Center (ARTCC). FDP2000 provides new hardware and software with added capabilities. The added capabilities include winds aloft modeling for improved aircraft position extrapolation accuracy, and support of Air Traffic Services Inter-facility Data Communications Systems (AIDC) ground-to-ground data link with compatible Flight Information Regions (FIRs). The OCS software was re-hosted from the Hewlett-Packard (HP) 1000 platform to the HP 9000 platform. FDP2000 provides flight data to the Microprocessor-En Route Automated Radar Tracking System (Micro-EARTS) radar data processing system. FDP2000 also integrates the existing Controller Pilot Data Link Communications (CPDLC) functions for data link communications with Future Air Navigation System 1/A (FANS 1/A)-equipped aircraft.

Mechanism: Flight Information System Rehost (FISR) [2464]

The FlightInformation System Rehost (FISR) provides the automated means for collecting and distributing weather (Service A messages), flight plan data, Pilot Report messages, and other operational information (Service B messages). The FlightInformation System Rehost will provide a web-enabled means for collecting and distributing the above information to all air traffic facilities.

Mechanism: Host Computer System (HCS) [9]

The Host Computer System (HCS) receives and processes surveillance reports, and flight plan information. The HCS sends search/beacon target, track and flight data, surveillance and alphanumeric weather information, time data, traffic management advisories and lists to the (Display System Replacement) DSR. The HCS associates surveillance-derived tracking information with flight-planning information. The DSR sends requests for flight data, flight data updates, and track control messages to the HCS. HCS-generated display orders are translated for use within the DSR workstation. While radar data processing is distributed among the terminal and En Route computer resources, the HCS performs virtually all of the flight data processing for its entire geographical area of responsibility. Every tower (ATCT) and terminal radar approach control (TRACON) relies exclusively on its parent HCS for flight data.

The HCS also runs algorithms that perform aircraft to aircraft (conflict alert) and aircraft to terrain (Minimum Safe Altitude Warning) separation assurance. The HCS algorithms provide visual and audible alerting to the controller when conflicts are identified.

The HCS presently supplies real time surveillance, flight data and other information to several decision support tools housed in collocated outboard processors connected via two-way high bandwidth links to the HCS and DSR. These are the (User Request Evaluation Tool, (URET), and the Traffic Management Advisory (TMA. URET performs probing of tentative flight plan changes to determine their viability. TMA provides sequencing and spacing information to align the aircraft in En Route airspace for approach.

Mechanism: Host Computer System / Oceanic Computer System Replacement (HCS / OCSR--HOCSR) [2293]

The Host Computer System & Oceanic Computer System Replacement (HCS/OCSR--HOCSR) was implemented because of potential Y2K hardware issues with previous hardware. Accordingly, HCS/OCSR provided a new hardware platform, new peripherals (printers and Keyboard Display Video Terminals--KVDT), a new Direct Access Storage Device (DASD), and new OS-370 software extensions to control the new hardware using legacy NAS software applications. Hardware was replaced in both the En Route and Anchorage Oceanic automation environments. HCS/OCSR did not modify the legacy software functions of either the HCS system (e.g., flight data processing, radar data processing) or the Ocean Display and Planning System (ODAPS) automation systems (e.g., filght data processing). Likewise, HCS/OCSR did not impact HID NAS LAN, URET, DSR or PAMRI.

Phase 1 and 2 (mainframe and software extension replacements) were completed prior to 2000. Phase 3 (DASD replacement) was completed in 2003. Phase 4 (peripheral replacement) will be completed in 2004. Enhancement planned for 2005 and beyond were cancelled as they are overtaken by ERAM. Each phase has its own waterfall, and consequently no waterfall can be provided in the Location section below.

Mechanism: Microprocessor-En Route Automated Radar Tracking System (Micro-EARTS) [219]

The Microprocessor-En Route Automated Radar Tracking System (Micro-EARTS) is a radar processing system implemented with Commercial Off-the-Shelf (COTS) equipment, for use in both En Route and Terminal environments. It provides single sensor and a mosaic display of traffic and weather using long- and short-range radars. At Anchorage, Alaska, Micro-EARTS also provides Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance and display. Micro-EARTS interfaces with multiple types of displays, including Display System Replacement (DSR), Digital Bright Radar Indicator Tower Equipment (DBRITE), and the flat panel tower controller displays.

Mechanism: Military Airspace Management System (MAMS) [323]

The Military Airspace Management System (MAMS) is an automated system that schedules and documents Special Use Airspace (SUA) and other related airspace utilization within the DOD. It receives airspace schedule messages (ASM) from local DOD airspace scheduling agencies. The MAMS Central Facility, located at Tinker Air Force Base, Oklahoma, transmits ASMs and utilization data to the FAA Special Use Airspace Management System (SAMS) Central Facility, located at the ATCSCC. The MAMS receives airspace response messages from the SAMS.

Mechanism: Model One Full Capacity (M1FC) [2454]

The Model One Full Capacity (M1FC) system, located at Automated Flight Service Stations (AFSS), interface with a Flight Service Data Processing System (FSDPS) at FAA Air Route Traffic Control Centers (ARTCC). The M1FC is an information processing system used by Flight Service Specialists to collect and distribute Notice to Airmen (NOTAM), weather information, and flight plan related data to General Aviation pilots. In addition, the system supports the timely initiation of search and rescue processing and the capability to reconstruct system events based on time, terminal, or aircraft information.

Mechanism: National Airspace System Infrastructure Management System Phase 1 (NIMS Phase 1) [2371]

National Airspace System Infrastructure Management System (NIMS) Phase 1 will consist of the following: 1. Increase the effectiveness of the operation, management, and control of NAS services and facilities; 2. Ensure the appropriate NAS equipment assets will be available to provide the capacity needed to handle projected air traffic levels; 3. Analyze information to establish trends, design predictive adaptive maintenance actions, and reduce critical equipment outage situations and aircraft delays; 4. Create a common Airway Facility (AF) operational data repository for accessibility across the user community; 5. Ensure that the required services are delivered in an era of declining monetary and personnel resources; and, 6. Reduce the future costs of doing business through AF workload reductions while continuously maintaining reliable, effective, and efficient service.

Mechanism: National Airspace System Infrastructure Management System Phase 2 (NIMS Phase 2) [2372]

National Airspace System Infrastructure Management System (NIMS) Phase 2 will enhance resource and enterprise management, by developing NAS customer and user interaction tools, and providing additional performance and cost trend analysis. The NIMS will provide status information to all NAS users in near real time via the System Wide Information Management (SWIM) system. NIMS Phase 2 will enhance NIMS Phase 1 by providing the tools to achieve the concept of NAS Infrastructure Management (NIM). This new approach to the operation and maintenance of the NAS infrastructure will incorporate a performance-based service management approach that is focused on achieving user and customer satisfaction and managing NAS infrastructure services. The key characteristics of the NIM concept are: 1. Consolidating expertise in control centers to provide rapid, effective response to customer needs, support centralized operational control, and gain efficiencies. 2. Centralized Remote Monitoring and Control of NAS infrastructure services and systems to provide efficient service delivery and systems management. 3. Nationwide Operations Planning to provide standardized field operations across the NAS to facilitate consistent interaction with customers. 4. Information Infrastructure to provide real-time information collection and distribution to provide common NAS performance metrics and cost accounting. 5. Performance Based Management to provide data for the prioritization of maintenance activities and investment decisions.

The NIMS Enterprise Management (EM) will monitor and control NAS subsystems, equipment, resources and the NIMS. An Enterprise Manager Suite, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers. The NIMS Resource Manager (RM) will support all NIMS Resource Functions. The NIMS RM, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers.

The NIMS Enterprise Manager will be integrated with the NIMS Resource Manager to provide, Automated Incident Ticketing, a Common Logging System, Real Time System Performance Monitoring, and a Centralized Logistics/Maintenance System.

Mechanism: National Airspace System Infrastructure Management System Phase 3 (NIMS Phase 3) [2373]

National Airspace System Infrastructure Management System (NIMS) Phase 3 will enhance Phase 2 enterprise and resource management, by further developing NAS customer and user interaction tools, and provide additional performance and cost trend analysis.

The NIMS Enterprise Management (EM) will monitor and control NAS subsystems, equipment and resources. The NIMS will provide status information to all NAS users in near real time via the System Wide Information Management (SWIM) system. An Enterprise Manager Suite, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers. The NIMS Resource Manager (RM) will support all NIMS Resource Functions. The NIMS RM, consisting of commercially available hardware and software components, is installed at each of the four Operations Control Centers.

The NIMS Enterprise Manager will be integrated with the NIMS Resource Manager to provide, Automated Incident Ticketing, a Common Logging System, Real Time System Performance Monitoring, and a Centralized Logistics/Maintenance System.

Mechanism: National Airspace System Resources System (NASR) [69]

The NASR system is a relational data management system that collects, processes, and distributes aeronautical data in the form of electronic files, publications, and reports. NASR is located at the National Flight Data Center (NFDC) and consists of the NASR processor and NFDC Workstations. NASR supports the day to day management of data about airports, runways, navigational aides, instrument landing systems, fixes, airways, military training routes, towers, and other fixed assets of the NAS. This data is used by the FAA to document the NAS environment in which air traffic opeations will occur. It is used as the basis for the FAA to produce various aeronautical publications.

Mechanism: National Operational Data Archive (NODA) [2317]

The National Operational Data Archive (NODA) stores and enables access to operational data for analysis and planning purposes. It provides data sets to current and future decision support tools (DSS) used to support business functions via the use of standard query language interfaces.

Mechanism: Notices-to-Airmen (NOTAMs) Distribution System (NOTAMs Distribution System) [2466]

The Notices-to-Airmen (NOTAMs) Distribution System provides a centralized distribution capability to over 600 facilities, using dedicated telecommunications. Initially it provides Federal Contract Tower (FCT) users with a web query capability for Domestic and Flight Data Center (FDC) NOTAMs. It disseminates NOTAMs directly, with acknowledgement capability, to Air Traffic Control Tower (ATCT), Terminal Radar Approach Control (TRACON), Automated Flight Service Station (AFSS), and Air Route Traffic Control Center (ARTCC) facilities, from the US NOTAM System master database. It will also provide geographic parsing of ATCT/TRACON Domestic NOTAMs with the capability to receive acknowledgements.

Mechanism: Oceanic Computer System (OCS) [555]

The Oceanic Computer System (OCS) is Anchorage's unique oceanic flight data processing system. OCS provides flight data to Anchorage's Microprocessor En Route Automated Radar Tracking System (MicroEARTS) radar data processing system and for procedural air traffic control (ATC) separation assurance services in oceanic regions of the Anchorage Flight Information Region (FIR). Additionally, OCS implements it's own version of data link for Future Air Navigation System (FANS)-equipped aircraft in Anchorage's offshore airspace.

Mechanism: Oceanic Display and Planning System (ODAPS) [220]

The Oceanic Display and Planning System (ODAPS) consists of equipment that monitors and tracks aircraft over the ocean. It communicates and displays position data and flight plan information to the air traffic controllers responsible for monitoring and routing air traffic in the U.S. oceanic airspace. ODAPS has a situation display of aircraft position based on extrapolation of periodic voice position reports and filed flight plans. ODAPS includes a conflict probe (CP) functionality, which provides advance notification whenever stored flight plan information indicates that loss of separation minima may occur between aircraft, airspace reservations or warning areas.

Mechanism: Oceanic Flight Data Processing System (OFDPS) [635]

The Oceanic Flight Data Processing System (OFDPS) is Honolulu''s unique flight data processing system. It uses modified Oceanic Display and Planning System (ODAPS) software to provide limited flight data processing including providing paper flight strips for the Micro-EARTS system at the Honolulu Center Radar Approach Control (CERAP). Like ODAPS, OFDPS was rehosted on to new hardware using the existing OFDPS application software as part of the En

Route Host/Oceanic Computer System Replacement (HOCSR) program. The OFDPS functionality will be replaced with STARS Preplanned Product Improvement (P3I) functionality.

Mechanism: Operational and Supportability Implementation System (OASIS) [42]

Operational and Supportability Implementation System (OASIS): The capabilities provided by the OASIS include alphanumeric and graphic weather product acquisition and display, flight plan processing, search and rescue services, and law enforcement support. The OASIS provides a real-time, multi-user, computer-based system that provides current weather information, forecast weather information, Notice to Airmen (NOTAM) information, and flight planning.

OASIS also supports flight service specialists at International Automated Flight Service Stations (IAFSS) that provide services associated with aircraft transiting the oceans.

Mechanism: Power Systems (Tech Refresh) (Pwr Sys (Tech Refresh)) [6353]

Pwr Sys (Tech Refresh) Description The Power Systems Tech Refresh) mechanism provides for the conditioning of commercial power, including uninterruptible power systems (UPS), to eliminate voltage dropouts, surges, and voltage sags caused by sources outside the facility. Power distribution, grounding, bonding and shielding of electrical system within the facility is also part of the Pwr Sys.

The Power Systems (Pwr Sys) mechanism provide the following tasks: 1.) ACEPS 2.) Training Facility, 3.) CPDS, 4.) Battery Replacements, 5.) DC Systems, 6.) EG, 7.) LPGBS, 8.) Power Cable, 9.) UPS, 10.) Contract Support.

Mechanism: Remote Maintenance Monitoring Subsystem (RMMS) [51]

Hardware and software components comprising a subsystem of the NAS infrastructure management system. RMMS monitors system performance to detect alarm or alert conditions and transmits appropriate messages to the maintenance processor system/subsystem (MPS). RMMS initiates diagnostics tests and adjusts/changes system parameters or configurations when properly commanded. There are approximately 5,000 RMMS in service.

Mechanism: Series 1 Replacement (S1R) [2439]

The Series 1 Replacement (S1R) is an interface to the Oceanic Display and Planning System (ODAPS). It provides a conduit through which the ODAPS receives and exchanges interfacility flight plan data. The S1R converts communication protocols and translates data formats so ODAPS can communicate with external systems and devices.

Mechanism: Special Use Airspace Management System (SAMS) [324]

The Special Use Airspace Management System (SAMS) is an automated system that supports integrated Special Use Airspace (SUA) schedule operations within the FAA and between the FAA and the DOD. The SAMS consists of the SAMS Central Facility (i.e., the SAMS Processor), located at the ATCSCC, and SAMS Workstations located at the ATCSCC, ARTCCs, Towers, TRACONs, and CERAPs. The SAMS Processor receives airspace schedule messages from the Military Airspace Management System (MAMS) Central Facility and transmits them to the SAMS Workstations. The SAMS Processor transmits airspace response messages to the MAMS.

Mechanism: Special Use Airspace Management System Upgrade 1 (SAMS Up1) [819]

Special Use Airspace Management System Upgrade 1 (SAMS Up1) collects dynamic Special Use Airspace (SUA) status from the Air Route Traffic Control Centers (ARTCCs) and redistributes it for the Airline Operations Centers (AOCs) and Aircraft via Flight Information Service (FIS).

Mechanism: Standard Automation Platform Convergence Phase 1 (SAP Conv P1) [6305]

The purpose of Standard Automation Platform Convergence Phase 1 (SAP Conv P1) is to reduce both procurement and recurring costs by standardizing and sharing as many hardware and software ATC Automation components as possible.

An engineering convergence task will begin in fiscal year 2005 and run through 2015. All components from each of the automation systems (STARS, ERAM, TFM, etc.) will be analyzed, and the "best of breed" and "core" components will be selected. SAP convergence will be performed in the following areas: (1) Hardware; (2) System Software (operating systems, Commercial-Off-The-Shelf tools, etc.); (3) ATC applications that can be shared across domains; (4) ATC applications that are unique to a domain; and (5) ATC system support tools that can be shared across domains (adaptation, data extraction or systems analysis recording, data reduction and analysis tools, etc.). Proven STARS and ERAM components will be slected, integrated into the SAP, and rigorously tested for replacing STARS and ERAM components at or near their end of service life.

Prototyping begun under Phase 1 will continue with SAP Conv P2. The results of both efforts will lead to refining the requirements to develop the SAP WS mechanism with SDP and FOMS applications.

Mechanism: Standard Automation Platform Convergence Phase 2 (SAP Conv P2) [6298]

Standard Automation Platform Convergence Phase 2 (SAP Conv P2) continues with prototyping started under Phase 1 to insure that recurring and technical refresh costs for ATC automation elements are minimized by using as many common components as prossible.

SAP Phase 2 incorporates upgrades and technical refreshes of ATC applications, systems software, and hardware to ensure use of common elements across the terminal, enroute, oceanic, command center, and airport surface ATC Automation domains.

Prototyping will conclude with Phase 2, and the results will lead to refining the requirements for development of the SAP WS mechanism with SDP and FOMS applications.

Mechanism: Standard Terminal Automation Replacement System (STARS) [91]

The Standard Terminal Automation Replacement System (STARS) processes primary and secondary radar information to acquire and track data points to display aircraft position for controllers. STARS provides safety tools such as, conflict alert (CA), Mode C intruder (MCI), final monitoring aid (FMA), Minimum Safe Altitude Warning (MSAW), Converging Runway Display Aid (CARDA), and Controller Automated Spacing Aid (CASA). Also, STARS provides the capability to implement the following enhancements: improved radar processing, Global Positioning System (GPS) compatibility, adaptive routing, Center Terminal Radar Approach Control (TRACON) Automation System (CTAS), data link implementation, improved weather display, and better utilization of traffic management information.

Mechanism: Standard Terminal Automation Replacement System Technological Refresh (STARS Tech Refresh) [2260]

The Standard Terminal Automation Replacement System Technological Refresh (STARS Tech Refresh) mechanism updates the STARS to replace obsolete hardware and installs STARS at older ARTS IIE and IIIE sites. STARS Tech Refresh will be deployed with Common ARTS functionality.

Mechanism: Standard Terminal Automation Replacement System at Offshore Facilities (STARS Offshore) [2258]

The Standard Terminal Automation Replacement System at Offshore Facilities (STARS Offshore) will replace the Microprocessor-En Route Automated Radar Tracking System (MicroEARTS) radar processing system functionality and provide limited flight data processing. STARS provides the capability to implement the following enhancements: improved radar processing, Global Positioning System (GPS) compatibility, adaptive routing, Center Terminal Radar Approach Control (TRACON) Automation System (CTAS), data link implementation, improved weather display, and better utilization of traffic management information. This is a joint procurement with the U.S. Department of Defense (DoD) and will achieve a common baseline for the FAA and DoD systems. STARS Preplanned Product Improvements (P3I) will upgrade the capabilities of STARS.

Mechanism: Surface Management System Prototype (SMS Proto) [331]

The Surface Management System Prototype (SMS Proto) provides surface management data feeds via ETMS interfaces to AOCs. The SMS Prototype main servers will be located at the ATCT/TRACON, with feeds to separate display processors located in ARTCCs (TMUs), TRACONs (TMUs), Ground and Ramp areas of ATCTs. SMS data will include surface surveillance data, flight plan data, gate assignment information, downstream restrictions and air carrier predictions of flight push-back times.

Mechanism: Surface Movement Advisor (Atlanta) (SMA (Atlanta)) [2392]

The Atlanta Surface Movement Advisor (SMA) processes and displays flight data for arrival and departure trafffic, and provides the data to the AOCs.

Mechanism: Surface Movement Advisor (Free Flight Phase 1) (SMA (FFP1)) [78]

The Surface Movement Advisor (Free Flight Phase 1) (SMA FFP1) is located at TRACONs and towers, has displays located at AOCs, and SMA and AOCs share information using ETMS and the ETMS Hub Site. SMA obtains aircraft arrival information, including aircraft identification and position, from TRACON automation and provides SMA information to airline ramps at towers and AOCs. Continual updates of touchdown times generated by SMA help airlines manage ground resources at the terminal more efficiently.

The SMA system is based on a client-server architecture running in a UNIX environment. A fiber backbone between the airlines, the airport management, the

(Airline) ramp towers and the FAA Control Tower links the SMA together. The system collects and manages various traffic data inputs from sources such as Automated Radar Terminal System (ARTS) (i.e., ARTS-IIIA and IIIE), Standard Terminal Automation Replacement System (STARS), TRACON RADAR, Official Airline Guide (OAG), and Aircraft Communications and Reporting System (ACARS) in real time by the SMA server and auxiliary network computer clients.

AOCs provide SMA with information such as flight readiness status within minutes of departure. SMA generates messages when a flight: (a) transitions from a Center to a TRACON, (b) is on final approach, and (c) has touchdown. SMA calculates estimated taxi time to the gate, time of arrival at the gate, and taxi time to take-off; and SMA uses historical data to project true demand on airport departure capacity. In 2003, SMA began transitioning from ARTS to STARS for receipt of flight arrival and departure information.

Mechanism: Surface Traffic Management System (STMS) [702]

The Surface Traffic Management System (STMS) provides flight and track data for surface management, combining the functions of SMA (FFP1) and SMS Prototype systems. Similar to SMS, the STMS servers and display processors will be located at the same facilities and, in addition, display processors will be located at the ATCSCC and Hub site. STMS data will include gate assignment information, downstream restrictions and air carrier predictions of flight push-back times. STMS may be enhanced to add communications via data link to the cockpit.

Mechanism: Telecommunications Processor (TP) [221]

The Telecommunications Processor (TP) distributes flight plan data to the Oceanic controllers and allow "search and scroll" capability, quick action function keys, and editing features to aid the controller in entering, and displaying, or composing new messages.

Mechanism: U.S. Notice to Airmen System - Replacement (USNS-R) [2319]

U.S. Notice to Airmen System - Replacement (USNS-R) system collects, processes, and maintains a processed Notice to Airmen (NOTAM) database consisting of all NOTAMs on domestic and foreign civilian and military facilities, services, procedures, etc., pertinent to National Airspace System (NAS) users and specialists; and an international (ICAO) NOTAM database exchanged with and accessible to international agencies. In addtion, GPS NOTAMs are maintained as well. The USNS-R will distribute the processed NOTAM to the respective user via the Aeronautical Information System (AIS) and Weather Message Switching Center Replacement (WMSCR). The USNS-R replaces the current Consolidated NOTAM System (CNS) and consists of an enhanced processor and the NOTAM Workstation.

Workstation

Mechanism: Advanced Technologies and Oceanic Procedures Controller Work Station (ATOP Controller WS) [2185]

The Advanced Technologies and Oceanic Procedures Controller Work Station (ATOP Controller WS). The ATOP Controller Workstation is part of a non-developmental item (NDI) automation, training, maintenance, installation, transition, and procedures development support acquisition. The workstation will interface with the integrated Flight Data Processing (FDP). The workstation will contain displays for information from primary and secondary radar, Automatic Dependent Surveillance (ADS), Controller Pilot Data Link Communications (CPDLC) position reports, and relayed pilot reports from High Frequency (HF) voice service provider. The ATOP workstation will support radar and non-radar procedural separation, tracking clearances issued via CPDLC or messages through the HF radio service provider, conflict detection/prediction capabilities through the use of controller tools, and coordination via Air Traffic Services Interfacility Data Communications System (AIDCS). Additionally, it is expected to support operations in which the information and primary capabilities required for the controller to maintain situational awareness and provide procedural separation services are available on the display (rather than paper flight strips).

Mechanism: Automated Flight Service Station Display (AFSSD) [71]

The Automated Flight Service Station Display (AFSSD) is a DOS-based workstation located at each specialist position. It provides alphanumeric text information of flight and NOTAM data in an un-integrated manner.

Mechanism: Automated Radar Terminal System Color Display (ACD) [757]

The Automated Radar Terminal System (ARTS) Color Display (ACD) is a high performance, full function, color display that replaces the Full Digital ARTS Display (FDAD) and the Data Entry and Display Subsystem (DEDS). The ACD supports keyboard and trackball functions for the ARTS IIA, ARTS IIE, and ARTS IIIE. A primary and secondary radar data path to the ACD is provided by a radar gateway function incorporated in the event of a failure of either the ARTS IIE and ARTS IIIA processing systems.

Mechanism: Automated Surface Observation System Controller Equipment (ACE) [387]

Automated Surface Observing System (ASOS) Controller Equipment (ACE) displays data from the ASOS in tower and terminal facilities.

Mechanism: Controller Chairs (Controller Chairs) [1427]

The Controller Chairs mechanism provides new chairs updated for new human factor designs that are used by air traffic controllers in all Air Traffic Control (ATC) facilities.

Mechanism: Data Entry and Display Subsystem (DEDS) [285]

The Data Entry and Display Subsystem (DEDS) is the Air Traffic Controller workstation for the Automated Terminal Radar System, Model IIIA (ARTS IIIA)

Mechanism: Digital Altimeter Setting Indicator (DASI) [65]

The Digital Altimeter Setting Indicator (DASI) provides a digital readout of barometric pressure and altimeter settings at Air Traffic Control Tower (ATCT) Terminal Radar Approach Control (TRACON) facilities.

Mechanism: Digital Bright Radar Indicator Tower Equipment (DBRITE) [2]

The Digital Bright Radar Indicator Tower Equipment (DBRITE) is a tower display system that provides a raster scan presentation of radar/beacon videos and automation system alphanumeric data. The system accepts radar, beacon, external map, analog data, and automation system data.

Mechanism: Display System Replacement (DSR) [5]

The Display System Replacement (DSR) provides continuous real-time, automated support to air traffic controllers for the display of surveillance, flight data and other critical control information. This information is processed by the Host and Oceanic Computer System Replacement (HOCSR) and the Enhanced Direct Access Radar Channel (EDARC) subsystems. The DSR provides controller workstations, displays, and input/output devices and a communications infrastructure to connect the DSR with external processing elements of the en route ATC automation system.

Mechanism: Display System Replacement - Ð position Technical Refresh (DSR - D-posit Tech Refresh) [6370]

Display System Replacement D-position Technical Refresh (DSR D-posit Tech Refresh) replaces the legacy D-position cathode ray tube (CRT) with a 20 1/4-inch diagonal square flat panel liquid crystal displays (LCD). It also replaces the D-position DSR processor and DSR LAN with a new processor and the URET LAN. This will establish a new DSR infrastructure for the URET National Deployment. It will also simplify the future transition from the URET LAN infrastructure to the ERAM LAN infrastructure, by means of which the DSR processor and Conflict Probe processor will be attached for data exchanges. The legacy D-posit Tech Refresh on the primary channel will be augmented with a backup channel D-posit by ERAM.

Mechanism: Display System Replacement - Ɍ position Technical Refresh (DSR - R-posit Tech Refresh) [2470]

Display System Replacement R-position Technical Refresh (DSR R-posit Tech Refresh) replaces the processor and LAN infrastructure for the R-position in preparation for ERAM. The replacement display will provide full and equivalent functionality (flight and surveillance data) on both the primary and backup ERAM channels. The R-position display processor will have direct data exchange capability with each of the ERAM LAN attached processors, including the Surveillance Data Processor (SDP), Flight Data Processor (FDP), Conflict Probe Processor (CPP), Traffic Management Advisor (TMA), and Controller-Pilot Data Link Communications (CPDLC).

Mechanism: Display System Replacement Console Reconfiguration Monitor Replacement (DSR CRMR) [2469]

Display System Replacement Console Reconfiguration Monitor Replacement (DSR CRMR) replaces the R-position cathode ray tube (CRT) with a 20 x 20-inch square flat panel liquid crystal displays (LCD). Replacement of the large CTR with a LCD will free up space in the rear of the DSR console for relocating Voice Switch Control System (VSCS) equipment. Relocating the VSCS Electronic Module (VEM) and the VSCS Training and Backup System (VTABS)--formerly known as VEM/PEM)--is part of this activity and will improve equipment efficiency, packaging and the productivity of maintenance personnel.

Mechanism: En Route Information Display System (ERIDS) [6336]

The En Route Information Display System (ERIDS) will provide real-time access to air traffic control information not currently available from the Host Computer System (HCS) and will make this auxillary information readily available to controllers. ERIDS will be installed at various positions, including the Traffic Management Units, Center Weather Service Units, and ARTCC Monitor and Control Centers. ERIDS will be integrated into the Display System consoles at each sector, will use the Centers airspace configuration for sector assignments, and will allow changes in sector assignments. ERIDS will display graphic and text data products, including air traffic control documents, Notices to Airmen (NOTAMS), weather data, traffic management data, and general information. ERIDS will exchange information with other facilities via interfaces to the Weather and Radar Processor, the Weather Information Network Server, U.S. NOTAM System, the Enhanced Traffic Management System, the National Airspace System Resources System, and the FAA Internet Protocol-Routed Multi-user Network (FIRMNet).

Mechanism: Enhanced Debrief Station (EDS) [2188]

The Enhanced Debrief Station (EDS) system is a personal computer (PC)-based medium fidelity simulation and training system, located at the FAA Academy, that works hand-in-hand with the Tower Operator Training System (TOTS), also located at the FAA Academy, by preparing the students in part-task functions of terminal air traffic control before they begin training in the TOTS environment. The EDS provides medium fidelity simulation for local or ground control tasks. It uses a three-screen presentation of the tower cab environment. A technical refresh will be required from 2006-2011.

Mechanism: Enhanced Surface Management System Workstation (ESMS Workstation) [2391]

The Enhanced Surface Management System Workstation (ESMS workstation) provides for the display and operator entry of ESMS data. ESMS workstations will be located at both FAA and airline facilities. ESMS workstation user capabilities will vary based upon the user. FAA users may have the ability to change configuration information, while airline users do not.

Mechanism: FAA Data Display System (FAADDS) [6332]

The FAADDS incorporates the functionality and products of separate legacy weather and information displays. Serving as both a tactical and strategic tool, FAADDS functionality and display can be tailored to support a variety of ATC positions such as Air Traffic Control, Traffic Manager, and FSS specialist.

Mechanism: Flight Data Input/Output (FDIO) [63]

The Flight Data Input/Output (FDIO) system provides flight progress information for use by the Tower, Terminal Radar Approach Control (TRACON) and Air Route Traffic Control Center (ARTCC) controllers. The FDIO system allows Air Traffic Control (ATC) Specialists to input automated flight data, perform data manipulation, and print flight strips.

Mechanism: Flight Data Input/Output Modification (Technical Refresh) (FDIO Mod (Tech Refresh)) [1716]

The Flight Data Input/Output Modification (Technical Refresh) (FDIO Mod (Tech Refresh)) mechanism replaces components that are uneconomical to maintain in the system providing an interface between the air traffic controller (terminal or en route) and the center computer. FDIO provides flight plan data in printed form for Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) controllers.

Mechanism: Full Digital Automated Radar Terminal System Display (FDAD) [79]

Full Digital ARTS Display (FDAD) is the fully digital ARTS display system that provides the display and data input devices for terminal controllers using ARTS IIIE and ARTS IIIA. The FDAD can work in analog video time share mode or full digital mode. The present application is analog video time share mode.

Mechanism: Integrated Information Workstation - Build 1 (IIW - Build 1) [6311]

IIW Build 1 will include the infrastructure and system interfaces to acquire, analyze, store, update, display, and manage the following information in an integrated manner: (1) National Airspace System (NAS) aeronautical, (2) airport environmental, (3) airborne and surface surveillance, (4) flight information, (5) weather information, and (6) NAS status. Build 1 will also replace its predecessor system, FAA Data Display System, as well as interface with the following systems in support of its mission: Flight Object Management, System Wide Information Management, Next Generation- Traffic Flow Management, Maintenance Management System, Unified Decision Management System, and Aeronautical Information Management.

Mechanism: Integrated Information Workstation - Build 2 (IIW - Build 2) [6301]

Build 2 will incorporate new hardware technology and software enhancements through a technical refresh program.

Mechanism: Interim Graphic Weather Display System (IGWDS) [8]

The Interim Graphic Weather Display System (IGWDS) provides a graphic weather display at Automated Flight Service Station (AFSS) installations.

Mechanism: Interim Situation Display (ISD) [218]

The Interim Situation Display (ISD) replaced the Oceanic Plan View Display (PVD) system. The ISD provides multi-colored displays, state-of-the-art architecture; window based soft-function keys, and advanced capabilities above the functionality of PVDs. The ISD software was developed according to the FAA oceanic requirements for the two Oceanic Display and Planning System (ODAPS) sites. The physical workstation is the Initial Section Suite System (ISSS) common console, which has the capability to adjust the shelf height and physically rotate a monitor up to 45 degrees, so that a single controller can monitor multiple displays.

Mechanism: Minnesota DSR Training Simulator (Minnesota DSR) [6406]

Display System Replacement (DSR) training equipment used to train en route students at the Minnesota Technical and Community College (previously called MARC). This equipment was purchased and is being kept up-to-date through a Congressionally-mandated program. Students who are trained on this equipment can by-pass the FAA Academy and go straight to the field. Approximately 96 students per year are trained on this equipment.

Mechanism: National Airspace System Information Display System - Tower (NAS IDS - Twr) [87]

The National Airspace System Information Display System - Tower (NAS IDS - Twr) is that portion of the NAS information display system that displays airport weather and environmental information to tower controllers and provides the information to the associated Terminal Radar Approach Control (TRACON) facility. Supports exchange of airport information with airport management, air carriers, and the National Weather Service (NWS). The NAS IDS Twr serves as a repository for airspace diagrams, approach plates, administrative services, and airport diagrams.

Mechanism: Operational and Supportability Implementation System - Work Station (OASIS W/S) [398]

The Operational and Supportability Implementation System - Work Station (OASIS W/S) is a Windows-based PC located at each specialist position. It includes COTS software applications to provide the AFSS specialist with an integrated view of flight, alphanumeric, and graphic weather data. Pre-Flight and in-flight service functions are also available from these workstations.

Mechanism: Operations Information System (OIS) [2329]

The Operations Information System (OIS) is a web-based system used at the Air Traffic Control System Command Center (ATCSCC) displaying current delay information, airport closures, significant weather information and additional National Airspace System (NAS) information that could affect the efficient flow of air traffic nationwide. The OIS interfaces are available and displayed within the Traffic Management Units (TMUs) across the NAS.

Mechanism: Radar Automated Display System (RADS) [81]

The Radar Automated Display System (RADS) is the Air Traffic Controller workstation for the Automated Radar Terminal System Model IIE (ARTS IIE).

Mechanism: Remote Automated Radar Terminal System (ARTS) Color Display (R-ACD) [6352]

Remote Automated Radar Terminal System Color Display (R-ACD) Description The Remote - Automated Radar Terminal System (ARTS) Color Display (ACD) is a high performance, full function, and color display providing air traffic controllers with the functionality of the Digital Bright Radar Indicator Tower Equipment (DBRITE). This display supports keyboard and trackball functions for the ARTS II, ARTS IIE, and ARTS IIIE. A radar gateway function will be incorporated to provide a primary and secondary radar data path to the R-ACD in the event of failure of both the ARTS II and ARTS IIIA processing systems.

Mechanism: Standard Automation Platform Remote Workstation Phase 1 (SAP RW Phase 1) [6307]

The SAP RW provides the controller in the tower and the specialist in Flight Advisory Services an interface to the Flight Object Management System and Surveillance Data Processor. The workstation additionally provides the tower controller a display of arrival/departure surveillance data.

Mechanism: Standard Automation Platform Remote Workstation Phase 2 (SAP RW Phase 2) [6300]

Provides Technical Refresh of SAP Remote Workstation Phase 1. The SAP RW provides the controller in the tower and the specialist in Flight Advisory Services an interface to the Flight Object Management System and Surveillance Data Processor. The workstation additionally provides the tower controller a display of arrival/departure surveillance data.

Mechanism: Standard Automation Platform Workstation Phase 1 (SAP WS Phase 1) [6306]

The SAP consists of the Flight Object Management System (FOMS), the Surveillance Data Processor (SDP), and the SAP Workstation. The SAP will be installed in En Route and Arrival/Departure facilities. The SDP performs surveillance data processing and tracking on Surveillance Data Objects received from the Surveillance Data Network. The FOMS performs flight plan processing, associates flight and track data, and publishes the Flight Object on the System Wide Information Management network. The SAP workstation provides the controller interface for the FOMS and SDP.

Mechanism: Standard Automation Platform Workstation Phase 2 (SAP WS Phase 2) [6299]

Provides a Technical Refresh of SAP Workstation Phase 1. The SAP consists of the Flight Object Management System (FOMS), the Surveillance Data Processor (SDP), and the SAP Workstation. The SAP will be installed in En Route and Arrival/Departure facilities. The SDP performs surveillance data processing and tracking on Surveillance Data Objects received from the Surveillance Data Network (SDN). The FOMS performs flight plan processing, associates flight and track data, and publishes the Flight Object on the System Wide Information Management network. The SAP workstation provides the controller interface for the FOMS and SDP.

Mechanism: Standard Terminal Automation Replacement System Early Display Configuration (STARS EDC) [756]

The Standard Terminal Automation Replacement System, Early Display Configuration (STARS EDC) provides STARS workstations at a limited number of ARTS IIIA facilities to replace aging DEDS and provide validation of the STARS workstation design before the complete STARS is implemented. STARS EDC will include updates to ARTS software for life cycle maintenance, additional human-machine interface (HMI) requirements for both tower and Terminal Radar Approach Control (TRACON), and Automated Radar Terminal System Model IIIE (ARTS IIIE) human factors validation.

Mechanism: Standard Terminal Automation Replacement System Terminal Controller Workstation (STARS TCW) [89]

The Standard Terminal Automation Replacement System Terminal Controller Workstation (STARS TCW) provides the interface between the Terminal Radar Approach Control (TRACON) controller and the STARS processing unit.

Mechanism: Standard Terminal Automation Replacement System Tower Display Workstation (STARS TDW) [6351]

The Standard Terminal Automation Replacement System Tower Display Workstation (STARS TDW) provides the interface between the ATC Towerl (ATCT) controller and the STARS processing unit.

Mechanism: Surface Movement Advisor (Atlanta) Workstation (SMA (Atlanta) Workstation) [2393]

Surface Movement Advisor (Atlanta) Workstation (SMA (Atlanta) Workstation) provides Arrival and Departure data is displayed to users. Airline and FAA users are given varying levels of access to make inputs to the SMA (Atlanta) system via this workstation. Airline users in the Ramp Control Operations area are provided the ability to enter aircraft push backs to taxi status, gate arrivals and return to gate messages. Other airline users FAA users are provided options to enhance surface traffic movement by using automated data to optimize runway balancing.

Mechanism: Systems Atlanta Information Display System (SAIDS) [386]

A Systems Atlanta Information Display System (SAIDS) enables users to collect and/or input, organize, format, update, disseminate, and display both static and real-time data regarding weather and other rapidly changing critical information to air traffic controllers and Air Traffic Control (ATC) supervisors/Managers. SAIDS is installed at Airport Traffic Control Towers (ATCT), Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Centers (ARTCC), regional offices, and Flight Service Station (FSS) facilities.

Mechanism: Tower Operator Training System (TOTS) [2187]

The Tower Operator Training System (TOTS) refers to the replacement of the FAA Academy Tower Simulator. TOTS is a simulator used to train air traffic control tower specialists at the FAA Academy. This system is a critical training tool in the Academy"s initial qualification course for terminal air traffic controllers. The replacement TOTS includes the capability to replicate a level 4 tower with the graphics capability to generate complex traffic scenarios and meet new functionality requirements for interdependent systems including ASOS, interfacing D-BRITE, LLWAS, and RVR. TOTS will have a field of view of 210 degrees. A technical refresh will be required from January 2006-2011.

Mechanism: Traffic Management Advisor Display Free Flight Phase 2 (TMA Display (FFP2)) (TMA Display FFP2) [6363]

The Traffic Management Advisor Display (Free Flight Phase 2) (TMA Display (FFP2)) is located at the Traffic Management Unit (TMU) and displays two views: The Timeline Graphical User Interface (TGUI) (TMA timeline data), and the Plan Graphical User Interface (PGUI) (Plan View Display).

Separate from the TMA Display in the TMU, TMA meter list data is passed from the TMA workstation to Host for display on the Display System Replacement (DSR) console.

Domain: Air Traffic Control Communication

Data Communication

Mechanism: Automatic Terminal Information Service (ATIS) [2309]

The Automatic Terminal Information Service (ATIS} equipment provides the continuous broadcast of recorded noncontrol information in selected high activity terminal areas. Information includes the time of the latest weather sequence, ceiling, visibility, obstructions to visibility, temperature, dew point (if available), wind direction (magnetic), and velocity, altimeter, other pertinent remarks, instrument approach and runway in use.

Mechanism: Commercial Weather Vendor (CWV) [2375]

Commercial Weather Vendor is a company that provides weather products and information for a fee.

Mechanism: Communications Management System (CMS) [6321]

The CMS Management and Control function performs tasks for overall management and control of all air/ground and ground/ground voice and data communications to support System Wide Information Management (SWIM). CMS will also incorporate a reconfiguration control function to support reconfigurable airspace assignments, data routing, and a digital recording for both voice and data.

The En Route Automation Modernization program has assumed the data recording function via the Standard Automation Platform, and the Digital Voice Recorder System performs the voice recording function. The CMS routing function is a data router that ensures transport of data communications among Air Traffic Control facilities and users of SWIM. Additionally, CMS integrates functionalities inherently provided by the voice switches, the voice recorders, and the ATN Router.

Mechanism: Controller Pilot Data Link Communications Build 1 (CPDLC Build 1) [754]

The Controller Pilot Data Link Communications Build 1 (CPDLC Build 1) - Initial deployment of CPDLC to Miami. Provides for the transmission and reception of messages between pilots and controllers in digital format. Specifically, request and acceptance of frequency changes on transfer from one sector to the next; initial pilot "check-in" to the sector and altitude verification; transmission of altimeter setting data, altitude, speed, heading assignments, route clearance, and non-critical messages from the controller to the pilot. CPDLC messages use the VDL-2 A/G communications sub-network provided by a Commercial Service Provider. CPDLC is comprised of two primary subsystems: the Data Link Applications Processor (DLAP) and the Context Management Application Processor Controller (CMAP). The DLAP functions as an Aeronautical Telecommunications Network (ATN) gateway for air-to-ground (A/G)data communications between air traffic control (ATC) en route automation equipment and aircraft. DLAP enables the transmission and reception of messages between pilots and controllers in digital format supporting Flight Information Services (FIS) and Controller-Pilot Data Link Communications (CPDLC). CPDLC messages use Very High Frequency Data Link Mode Two (VDL-2) A/G communications sub-network provided by a Commercial Service Provider. The CMAP is used to initiate a data link connection (logon). This connection includes the following information: aircraft and flight identification, departure airport, destination airport, and (optionally) time of departure. All CMAP functions shall comply with the International Civil Aviation Organization (ICAO) Aeronautical Telecommunications Network (ATN) Standard and Recommended Practices (SARPS) Class 1 Operations. The CMAP maintains a database of aircraft application information and addresses and provides the CPDLC application the information when requested. The CMAP also removes database entries after an established parameter time has expired.

Mechanism: Controller Pilot Data Link Communications National Deployment (CPDLC National Deployment) [1410]

CPDLC National Deployment entails implementation of the CPDLC Build 1 functionality to all En Route Centers. The CPDLC mechanism is a combination of communication and automation systems. It uses the En Route controller display and automation systems to create ICAO standard ATC messages. It uses flight information from the automation system to address the messages and transmits/receives messages to/from CPDLC equipped aircraft via a digital communication link. CPDLC is used by ATC Specialists and pilots to replace routine ATC voice communications with more efficient data communications.

The National Deployment of CPDLC implements the CPDLC funtionality into En Route Centers via integration with the En Route Automation Modernization (ERAM) system.

Mechanism: Digital- Automated Terminal Information Service SLEP (D-ATIS SLEP) [6342]

This extends the life of the D-ATIS.

Mechanism: Flight Information System - Data Link (FISDL) [746]

The Flight Information System - Data Link (FISDL) provides Pilots weather, NOTAM, airfield information and other selected data through a service vendor operating on FAA provided VHF channels. The FISDL service is being facilitated through a FAA/Industry agreement allowing a commercial service provider to offer graphical and textual FIS/weather products to the cockpit of equipped aircraft. This vendor operated service is being provided as a near-term capability consistent with the FAA FIS Policy Statement of 1998. This vendor operated service will be phased out when the FAA is able to offer simliar FISDL services through FAA operated data link resources (e.g., via the UAT link using the BSGS and TIS-FIS Broadcast Server mechanism).

Mechanism: High Frequency Data Link (HF Data Link) [698]

The High Frequency Data Link (HF Data Link) provides two-way low-speed analog data communications over HF radios. HF Data Link is provided by a communications service provider in the transoceanic domain.

Mechanism: Light Gun (Light Gun) [2361]

A light gun (light gun) provides direct visual signals to pilots in aircraft and drivers of vehicles on the airport surface. The light gun provides an alternate means of communications. It is used when voice communications fails and there is direct line of sight to the aircraft or vehicle. It is sometimes used in conjunction with voice communications.

Mechanism: Multi-Sector Oceanic Data Link (MSODL) [705]

Multi-sector Oceanic Data Link System (MSODL) supports air-ground data link communications and extends single sector data link functionality to all Oceanic Display and Planning System (ODAPS) sector positions. Oceanic Data Link (ODL) gives controllers two-way electronic communications with aircraft equipped with data link. The technology is designed to reduce/eliminate the need for voice communication thus improving the reliability and timeliness of message delivery. The ODL provides a means to automatically check pending clearances for conflicts, while enabling flight crews automatically to load flight clearances into the Flight Management System (FMS). The ODL also gives controllers an integrated interface with the flight data processor (FDP). It also addresses problems with the existing high-frequency (HF) communications with aircraft, such as frequency congestion, transcription errors and lack of timeliness.

Mechanism: Next Generation Air/Ground Communication System Ground Network Interface / Radio Interface Unit Infrastructure (NEXCOM GNI / RIU Infrastructure) [2029]

The Ground Network Infrastructure consists of the Ground Netwok Interface (GNI) and the Radio Interface Unit (RIU), which includes the hardware used at the control site (Air Route Traffic Control Center (ARTCC) or a Terminal Radar Approach Control (TRACON) facility), and the Radio Site, respectively.

The GNI multiplex and de-multiplex voice and data information between the control site and the radios. Whereas the RIU includes vocoders to translate analog voice signals to and from narrow band digital representations of voice.

Mechanism: Satellite Telecommunications Data Link (SATCOM DL) [786]

Oceanic Centers use Satellite Telecommunications Data Link (SATCOM DL) mechanism transfer data between ground stations and aircraft. The FAA contracts for the satellite communications services and uses FANS-1A applications in the Oceanic automation system.

The FAA has no plans to develop its own SATCOM air to ground communications system.

Mechanism: Surveillance Processor (Safe Flight 21) (Surveillance Proc (SF-21)) [2413]

The Surveillance Processor (Safe Flight 21) is a demonstration system that receives, processes, and distributes surveillance data between Safe Flight 21 (SF-21) architectural elements to support operational trials. The processor receives surveillance data from various sources, including surveillance sensors, Automatic Dependent Surveillance-Broadcast (ADS-B) systems, multilateration systems, Air Traffic Control (ATC) automation systems, and flight plan processing systems. The processor fuses the various surveillance data to create aircraft track data, which is distributed to various SF-21 architectural elements. One of the capabilities supported by the processor is the processing and distribution of Traffic Information Services - Broadcast (TIS-B) information to ADS (SF-21) Ground Stations, for subsequent transmission to aircraft.

Mechanism: System Wide Information Management Build 1A (SWIM Build 1A) [6318]

SWIM provides for National Airspace System (NAS)-wide transport and sharing of information between the Federal Aviation Administration and users. SWIM is a consistent and single point of entry for users to publish and subscribe to NAS data. SWIM provides context-sensitive information to NAS elements that require the information. SWIM replaces many single-focus networks, such as FIRMNet and CDMnet. This build will integrate Aeronautical, Weather, and NAS Resource Status information systems into the SWIM architecture. A SWIM Management Unit, at each facility, will support the sending (publishing) and receiving (subscribing) of data on SWIM and the SDN. A central SWIM Directory Management Unit will maintain a directory of data available for subscription and publication.

Mechanism: System Wide Information Management Build 1B (SWIM Build 1B) [6302]

Build 1B provides all items in 1A, including more NAS information. This build integrates Flight and Surveillance Information systems into the SWIM architecture.

Mechanism: System Wide Information Management Build 2 (SWIM Build 2) [6303]

SWIM Build 2 provides all items in both 1A and 1B, including air-ground network integration. Build 2 includes integration of SWIM with the Aeronautical Telecommunications Network, Next Generation Air/Ground Communications, Satellite Communications, Ground Based Transceivers, Traffic Information Service-Broadcast, and Flight Information Service-Broadcast.

Mechanism: Terminal Weather Information for Pilots (TWIP) [716]

The Terminal Weather Information for Pilots (TWIP) mechanism provides jetliner pilots with direct access to limited weather information from each of 47 TDWR sites via a commercial communications service provider. TWIP enables jetliner pilots of equipped aircraft to view a rough depiction of hazardous weather (heavy precip, windshear/microbursts) similar to what is displayed in the tower and the Terminal Radar Approach Control (TRACON). TWIP is to be transitioned/incorporated into the Integrated Terminal Weather System (ITWS) and the Weather Systems Processor (WSP).

Mechanism: Tower Data Link System Refresh (TDLS Refresh) [686]

The Tower Data Link System (TDLS) automates tower-generated information for transmission to aircraft via data link. TDLS interfaces with sources of local weather data and flight data and provides Pre-Departure Clearance (PDC) and Digital-Automatic Terminal Information System (D-ATIS). PDC helps tower clearance delivery specialists compose and deliver departure clearances. The information is then transmitted in text form via the Aircraft Communication and Reporting System (ACARS) to an ACARS- equipped aircraft for review and acknowledgment by the flight crew.

Incorporating Digital-ATIS (D-ATIS) into TDLS allows: (1) Real-time ATIS updates throughout the NAS (2) Text message printouts, vise hand written recordings (3) Pilots to receive destination ATIS information, prior to take-off. For example, receive ATL''s ATIS broadcast while sitting in ORD. This list is not all-inclusive.

Video Communication

Voice Communication

Mechanism: Air/Ground Communications RFI Elimination (RFI ELIM) [1394]

Air/Ground Communications Radio Frequency Interference Elimination (RFI ELIM) consist of the deployment of RFI filters for problem resolution of RFI emissions at air/ground radio sites. Obsolete Linear Power Amplifiers (LPAs) are replaced, including Reciever Multicouplers and a Transmitter Combiners that allow one antenna to be shared by four receivers or transmitters, respectively.

Mechanism: Backup Emergency Communications (BUEC) [35]

Back Up Emergency Communications (BUEC) provides a secondary A/G communications path for the en route environment, giving each controller access to another completely diverse radio channel. The original system, previously employed at all 20 CONUS ARTCCs, uses a limited number of tunable transceivers that are shared by a greater number of controllers through a priority system at the ARTCC.

The old BUEC is being replaced with dedicated BUEC channels on a one per sector basis to solve a serious supportability problem with the 30+-year-old system and to provide each controller with improved back up radio coverage. The new BUEC outlets have been sited for best coverage for the sectors"" service volumes that because of size require multiple RCAGs for coverage will have multiple BUEC sites. The program has no prime contractor. All activities including site selection, engineering, site preparation, transition, and testing are performed by the ANI and regional personnel. The Product Team provides equipment and funding for implementation. The new BUEC system employs the same equipment as the RCAGs.

Mechanism: Backup Emergency Communications Replacement (BUEC Repl) [625]

The Backup Emergency Communications (BUEC) Replacement (BUEC Repl) mechanism replaces existing analog BUEC system with an updated analoq BUEC system. Also provides backup for Remote Communications Air-Ground Facility (RCAG) very high frequency (VHF) and ultra high frequency (UHF) communications channels (radio equipment) that are available to an Air Route Traffic Control Center (ARTCC) for immediate use if one or more primary RCAG frequencies fail. The system consists of remotely controlled equipment, and several VHF and UHF transceivers. A typical BUEC system may provide as many as 60 VHF and UHF transceivers for an ARTCC.

Mechanism: Command and Control Communications (C3) [23]

Emergency Command and Control Communications (C3) systems are defined as those means of communications that the FAA employs to direct management, operations, and reconstitution of the National Airspace System (NAS) in support of FAA, U.S. Department of Transportation (DOT), and Department of Defense (DOD) missions during national disasters or national security emergencies. The FAA maintains a variety of fixed-position, portable, and transportable C3 communications systems for use in support of emergency operations. Such C3 system includes: National Radio Communications System (NARACS), High Frequency/Single Side Band (HF/SSB), Defense Messaging System (DMS), Very High Frequency/Frequency Modulated (VHF/FM), Secure Telephone Equipment (STE), Secure Facsimile, satellite telephone network (AMSC), Automated Notification System (ANS), Secure Conferencing System (SCS), and the Communications Support Teams (CST). Command and Control Communications (C3), was previously called Recovery Communications (RCOM).

Mechanism: Conference Control System (CCS) [2453]

The Conference Control System (CCS) is a replacement system for the legacy Operational Telephone System (OTS). The CCS is a telecommunications conferencing system that provides voice connectivity, switching, and teleconferencing capabilities for the Traffic Management Specialists and the NAS Operations Manager, at the FAA Air Traffic Control System Command Center (ATCSCC) in Herndon, VA. CCS enables communication from ATCSCC to Traffic Management Units (TMUs) at ARTCC and TRACONS, the Severe Weather Group at ARTCCs, FAA Regional Offices, FAA Headquarters, Airline Operations Centers (AOCs), and the general aviation community.

Mechanism: Digital Voice Recorder System (DVRS) [15]

Provides modern digital voice recording devices used to record all communications by air traffic controllers in Towers, TRACONs, AFSSs, and ARTCCs. Voice communications between controllers, pilots, and other ground based air traffic facilities are recorded for legal and accident investigation purposes.

In Feburary 2004, the DVRS was upgraded with a 24-channel card, which replaced the 16-channel card. This minor upgrade, called DVR II, was not extended to the systems installed prior to February 2004.

Mechanism: Digital Voice Recorder System Replacement (DVRS Replacement) [103]

The Digital Voice Recorder System Replacement (DVRS Replacement) is a modern digital system used to record all communications by air traffic controllers in

Towers, TRACONs, AFSSs, and ARTCCs. Voice communications between controllers, pilots, and other ground based air traffic facilities are recorded for legal and accident investigation purposes.

Mechanism: Emergency Transceiver Replacement (ETR) [134]

The Emergency Transceiver (ETR) Program provides portable dual-band (UHF/VHF) A/G radios for back up communications at ATCTs and TRACONs. These new radios provide at least thirty minutes of operation on their battery pack. In addition, they can be operated from 12 volt DC vehicle power, as well as from an alternate 120 volt AC source. When connected to an external antenna, they can be used from the controller position in case of catastrophic communications or power failure. They can also be carried out of the facility and operated on their own antennas when fire or some disaster forces building evacuation.

A five-year contract was awarded to Motorola in June 1994 for new transceivers (PET-2000) to replace a variety of obsolete, unsupportable radios that did not meet operational or spectral emission requirements. The radios were purchased with a ten year warranty, training and logistic documentation. A total of 1,309 PET-2000s were delivered to FAALC from where they were shipped to using locations throughout the NAS. In addition to the radios, the regions were provided antennas (if required) along with limited funds to cover the installation. Because the contract for the PET-2000 expired before sufficient funding could be obtained to satisfy the total replacement requirements and because a small number are needed each year for growth, steps are being taken to identify additional funding and a contract vehicle to acquire additional transceivers.

Mechanism: Emergency Voice Communications System (EVCS) [783]

The Emergency Voice Communications System (EVCS) is located at Headquarters (HQ), Regional Offices, several Air Route Traffic Control Centers (ARTCCs), Level 5 Terminal Radar Approach Control (TRACON) facilities, and other selected sites. EVCS uses two (2) dedicated Federal Telecommunications Service 2001 (FTS2001) dial access channels at most FAA locations. Dedicated dial lines using the Public Switched Telephone Network (PSTN) are used at locations not having direct access to FTS2001. Supports HQ and Regional Communications Command Centers"" functions for accident and incident reports, hijacks, aircraft crashes, aviation security matters, military activities, natural disasters, etc.

Mechanism: Enhanced Terminal Voice Switch (ETVS) [16]

The Enhanced Terminal Voice Switches (ETVS) are installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) facilities with more than four air traffic controller positions. The ETVS is a modular system. The size of the switch is based on the number of controller positions in the facility.

The ETVS (installed in the ATCT) provides the ATC operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the ETVS.

The ETVS (installed in the TRACON) provides the ATC operational G/G voice communications interconnectivity between controllers within a TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the ETVS.

AND anticipates acquiring a transition voice switch (Interim Voice Switch Replacement (IVSR) mechanism to migrate ETVS systems to the target NAS Voice Communication Switching and Control Service (NAS V-Com). The IVRS contract award is planned for 09/01/04.

Mechanism: Flexible Voice Switch (Flexible VS) [6328]

Voice communications is the primary means of communications among ATC facilities and between an Air Traffic Control Specialist (ATCS) and a pilot. Voice switching provides the ATCS both G/G Interfacility/Intrafacility and A/G voice communications connectivity. The NAS Voice Switch (NVS) program will replace aging voice switches and their analog interfaces with modern digital voice switches consisting of digital interfaces. The Flexible Voice Switch will be the common platform and baseline voice switch for all NAS domains with modularity and scalability to meet communications connectivity requirements. Additionally, this switch will be expandable to accommodate growth capacity requirements and able to support NAS Modernization needs as described in various Operational Improvements.

Mechanism: High Frequency Ground Radios (HF Ground Radios) [2345]

High Frequency (HF) Ground Radios are analog HF radio devices operating in the 2 - 30 Mhz frequency band, which may be single channel transmitters and receivers or multi-channel transceivers. These radio devices are installed at oceanic and en route facilities and used to support tactical air traffic control (ATC) voice communications between a ground controller and a pilot in an aircraft in the oceanic domain. Additionally, these devices are also installed at regional facilities and used to support voice command and control communications /coordination in emergency or during disaster recovery situations occurring in the NAS.

Mechanism: Integrated Communications Switching System Type I (ICSS I) [18]

The Integrated Communications Switching System Type I (ICSS I) are installed at Airport Traffic Control Towers (ATCT), Terminal Radar Approach Control (TRACON) facilities, and Automated Flight Service Stations (AFSS).

The ICSS I (installed in the ATCT) provides the air traffic control (ATC) operational ground-ground voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/air traffic control system command center (ATCSCC) specialists. Ground-air radio connectivity between ATCT controllers and pilots is also supported by the ICSS I.

The ICSS I (installed in the TRACON) provides the ATC operational ground-ground voice communications interconnectivity between controllers within TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. Ground-air radio connectivity between TRACON controllers and pilots is also supported by the ICSS I.

The ICSS I (installed in the AFSS) provides the ATC operational ground-ground voice communications interconnectivity between specialists within an AFSS (intercom), interconnectivity between specialists in separate AFSSs (interphone), and interconnectivity between Flight Service Station (FSS) specialists and Air Route Traffic Control Center (ARTCC) controllers/TRACON controllers/ATCT controllers/Air Traffic Control System Command Center (ATCSCC) specialists. Ground-air radio connectivity between AFSS specialists and pilots is also supported by the ICSS I.

Mechanism: Integrated Communications Switching System Type II (ICSS II) [2312]

The Integrated Communications Switching System Type II (ICSS II) are installed at Airport Traffic Control Towers (ATCT), Automated Flight Service Stations (AFSS), and Terminal Radar Approach Control (TRACON) facilities.

The ICSS II (installed in the ATCT) provides the air traffic control (ATC) operational ground-ground voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. Ground-air radio connectivity between ATCT controllers and pilots is also supported by the ICSS II.

The ICSS II (installed in the TRACON) provides the ATC operational ground-ground voice communications interconnectivity between controllers within TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC)) controllers/ Flight Service Station (FSS) specialists/air traffic control system command center (ATCSCC) specialists. Ground-air radio connectivity between TRACON controllers and pilots is also supported by the ICSS II.

Mechanism: Integrated Communications Switching System Type III (ICSS III) [2313]

The Integrated Communications Switching System Type III (ICSS III) is installed at Automated Flight Service Stations (AFSS). The ICSS III (installed in the AFSS) provides the air traffic control (ATC) operational ground-to-ground (G/G)voice communications interconnectivity between specialists within an AFSS (intercom), interconnectivity between specialists in separate AFSSs (interphone), and interconnectivity between Flight Service Station (FSS) specialists and Air Route Traffic Control Center (ARTCC) controllers/Terminal Radar Approach Control (TRACON) controllers/ATCT controllers/Air Traffic Control System

Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between AFSS specialists and pilots is also supported by the ICSS III.

AND anticipates acquiring a transition voice switch (Interim Voice Switch Replacement (IVSR) mechanism to migrate RDVS II systems to the target NAS Voice Communication Switching and Control Service (NAS V-Com). The IVRS contract award is planned for 09/01/04.

Mechanism: Multi-Mode Digital Radios (MDR) [2014]

Multi-Mode Digital Radios (MDRs) are ground-based Very High Frequency (VHF) air-traffic-control radios that can operate in several configurations: 1) analog voice with 25kHz channel spacing; 2) analog voice with 8.33 kHz channel spacing; and 3) VHF Data Link (VDL) Mode-3 which consists of two-way digital voice and data communication.

Mechanism: Multichannel Voice Recorders (MVR) [20]

Multichannel Voice Recorders (MVR) are analog voice recording devices, located at air traffic control (ATC) facilities that record voice communications between air traffic controllers and pilots.

Mechanism: Operational Telephone System (OTS) [26]

The Operational Telephone System (OTS) is a telecommunications conferencing system that provides voice connectivity, switching, and teleconferencing capabilities for Traffic Management Specialist (TMS) and the NAS Operations Manager (NOM), at the FAA Air Traffic Control System Command Center (ATCSCC) in Herdon, VA. The OTS interfaces with field facilities traffic management units (TMUs), the Severe Weather Group at Air Route Traffic Control Centers (ARTCCs), key FAA Regional Offices, FAA Headquarters, and the general aviation community including Airline Operations Centers (AOCs).

Mechanism: Rapid Deployment Voice Switch Type I (RDVS I) [19]

The Rapid Deployment Voice Switch Type I (RDVS I) is installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) and large TRACON facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility. The RDVS I (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the RDVS I. The RDVS I (installed in the TRACON) provides the ATC operational G/G voice communications interconnectivity between controllers within an TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS I.

AND anticipates acquiring a transition voice switch (Interim Voice Switch Replacement (IVSR) mechanism to migrate RDVS I systems to the target NAS Voice Communication Switching and Control Service (NAS V-Com). The IVRS contract award is planned for 09/01/04.

Mechanism: Rapid Deployment Voice Switch Type II (RDVS II) [24]

The Rapid Deployment Voice Switch Type II (RDVS II) is installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) and large TRACON facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility. The RDVS II (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the RDVS II. The RDVS II (installed in the TRACON) provides the ATC operational G/G voice communications interconnectivity between controllers within an TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. A/G radio connectivity between TRACON controllers and pilots is also supported by the RDVS II.

AND anticipates acquiring a transition voice switch (Interim Voice Switch Replacement (IVSR) mechanism to migrate RDVS II systems to the target NAS Voice Communication Switching and Control Service (NAS V-Com). The IVRS contract award is planned for 09/01/04.

Mechanism: Rapid Deployment Voice Switch Type IIA (RDVS IIA) [2315]

The Rapid Deployment Voice Switch Type IIA (RDVS IIA) is installed at Airport Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) and large TRACON facilities with more than four air traffic controller positions. The RDVS is a modular system. The size of the switch is based on the number of controller positions in the facility. The RDVS IIA (installed in the ATCT) provides the air traffic control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and TRACON controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. The RDVS IIA also supports air-to-ground (A/G) radio connectivity between ATCT controllers and pilots. The RDVS IIA (installed in the TRACON) provides the ATC operational G/G voice communications interconnectivity between controllers within an TRACON (intercom), interconnectivity between controllers in separate TRACONs (interphone), and interconnectivity between TRACON controllers and ATCT controllers/Air Route Traffic Control Center (ARTCC) controllers/ Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between TRACON controllers and pilots is also supported by the RDVS IIA.

AND anticipates acquiring a transition voice switch (Interim Voice Switch Replacement (IVSR) mechanism to migrate RDVS IIA systems to the target NAS Voice Communication Switching and Control Service (NAS V-Com). The IVRS contract award is planned for 09/01/04.

Mechanism: Satellite Communication Ground Radios (SATCOM Ground Radios) [2346]

Satellite Communications (SATCOM) Ground Radios are transceivers installed at oceanic and en route facilities to support an alternative means of tactical air traffic control (ATC) voice communications between ground controllers and pilots in aircraft. These transceivers are typically used in transoceanic applications. These transceivers are also installed at regional facilities and used as an alternate means of communications in case of total ground communications failure or between locations in mountainous terrain or where other means of communications are not possible (e.g., Alaska).

Oceanic air to ground satellite communications are provided via a communications service provider. The FAA currently has no plans to develop or implement its own air to ground SATCOM ground radios.

Mechanism: Small Tower Voice Switch (STVS) [25]

The Small Tower Voice Switch (STVS) is installed in small Airport Traffic Control Towers (ATCT) and in Flight Service Stations (FSS). The basic STVS has four operator positions. The STVS provides the Air Traffic Control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ATCT (intercom), interconnectivity between controllers in separate ATCTs (interphone), and interconnectivity between ATCT controllers and Air Route Traffic Control Center (ARTCC) controllers/ Terminal Radar Approach Control (TRACON) controllers/FSS specialists/air traffic control system command center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ATCT controllers and pilots is also supported by the STVS. The STVS (installed in the FSS) provides the ATC operational G/G voice communications interconnectivity between specialists within an FSS (intercom), interconnectivity between specialists in separate FSSs (interphone), and interconnectivity between FSS specialists and Air Route Traffic Control Center (ARTCC) controllers/Terminal Radar Approach Control (TRACON) controllers/ATCT controllers/Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground radio connectivity between FSS specialists and pilots is also supported by the STVS.

AND anticipates acquiring a transition voice switch (Interim Voice Switch Replacement (IVSR) mechanism to migrate STVS systems to the target NAS Voice Communication Switching and Control Service (NAS V-Com). The IVRS contract award is planned for 09/01/04.

Mechanism: Ultra High Frequency Ground Radios (UHF Ground Radios) [2243]

Ultra High Frequency (UHF) Ground Radios are analog UHF amplitude modulation (UHF - AM) radio devices operating in the 225 - 400 Mhz frequency band which are single channel transmitters and receivers operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) via voice communications and coordination between the ground-based controller and the military pilot in military aircraft in the oceanic, en route, terminal, and flight service station domains.

Mechanism: Ultra High Frequency Ground Radios - Replacement (UHF Ground Radios - Relp) [626]

The Ultra High Frequency Ground Radios - Replacement (UHF Ground Radios - Repl) mechanism represents analog, ultra high frequency, amplitude modulation (UHF - AM) radio devices operating in the 225 - 400 MHz frequency band which are single channel transmitters and receivers operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) via voice communications and coordination between the ground-based controller and the military pilot in military aircraft in the oceanic, en route, terminal, and Flight Service Station domains.

Mechanism: Very High Frequency / Ultra High Frequency Emergency Communications Transceivers - Terminal (VHF/UHF ECT - Terminal) [2344]

Very High Frequency / Ultra High Frequency Emergency Communications Transceivers - Terminal (VHF/UHF ECT - Terminal) are analog VHF and UHF transceivers operating in either the 118 - 137 Mhz or 225 - 400 Mhz frequency bands. These transceivers are used in the terminal domain as emergency communications.

Mechanism: Very High Frequency Ground Radios (VHF Ground Radios) [303]

Very High Frequency (VHF) Ground Radios are analog VHF amplitude modulation (VHF - AM) radio devices operating in the 118 - 137 MHz frequency band which are single-channel transmitters and receivers operating in a main/standby configuration. These ground-based devices support tactical air traffic control (ATC) via voice communications and coordination between the ground-based controller and the pilot in commercial, cargo, or general aviation aircraft in the oceanic, en route (i.e., ARTCC), terminal (i.e., TRACON/tower), and flight service station domains. Additionally, there are analog VHF frequency modulation (VHF - FM) radio devices operating in the 161 - 174 MHz frequency band that are multi-channel transceivers. These transceivers are used by flight inspection, aviation security, and airway facility specialists supporting local airport operations and maintenance or to perform their operational maintenance mission in support of the NAS. However, these same VHF-FM transceivers are also used to support the resolution of emergency situations or establish a level of voice command and control communications/coordination during disaster recovery.

Mechanism: Very High Frequency Mobile Radios (VHF Mobile Radios) [2440]

Very High Frequency (VHF) Mobile Radios are analog VHF amplitude modulation (VHF - AM) radio devices operating in the 118 - 137 Mhz frequency band which are multi-channel transceivers installed in surface vehicles (e.g., "follow-me," maintenance, administrative, and snow-removal vehicles). These devices support the tactical two-way voice communications/coordination between the operators in the vehicles and the tower controllers or airline operations personnel.

Mechanism: Voice Switching and Control System (VSCS) [27]

The Voice Switching and Control System (VSCS) is installed in the Air Route Traffic Control Center (ARTCC). The VSCS is a modular system. The size of the switch is based on the number of controller positions in the facility.

The VSCS provides the Air Traffic Control (ATC) operational ground-to-ground (G/G) voice communications interconnectivity between controllers within an ARTCC (intercom), interconnectivity between controllers in separate ARTCCs (interphone), and interconnectivity between ARTCC controllers and Terminal Radar Approach Control (TRACON) controllers/Airport Traffic Control Tower (ATCT) controllers/Flight Service Station (FSS) specialists/Air Traffic Control System Command Center (ATCSCC) specialists. Air-to-ground (A/G) radio connectivity between ARTCC controllers and pilots is also supported by the VSCS.

Mechanism: Voice Switching and Control System Modification (Control System Upgrade) (VSCS Mod (Control System Upgrade)) [2460]

The VSCS control system upgrade (VCSU) is a replacement of the Tandem computers that perform the logical switching and control for the VSCS system. The replacement of Tandem computers is for all ARTCCs including three spares.

Mechanism: Voice Switching and Control System Modification (Technological Refresh) (VSCS Mod (Tech Refresh)) [2253]

The Tech Refresh for VSCS is a service life extension. The Tech Refresh encompasses workstation upgrade, video display monitor, control equipment power, VSCU supportability, control shelf power supply, and software development demonstration system expansion.

Mechanism: Voice Switching and Control System Training and Backup Switches (VTABS) [1736]

Voice Switching and Control System Training and Backup Switch (VTABS) was developed to meet AT requirements for a separate standalone VSCS Backup and Training System. VTABS can be configured as a 50-position switch with the capability to support air traffic operations in the event of VSCS failure, hardware and software maintenance or power loss.

Mechanism: Western Electric Company Model 301 Voice Switch (WECO 301) [46]

The Western Electric Company Model 301 Voice Switch (WECO 301) supports air-to-ground communications between air traffic controllers and pilots and ground-to-ground communications among air traffic control (ATC) personnel.

WAN Communication

Mechanism: Administrative Data Telecommunications Network 2000 (ADTN2000) [97]

The Administrative Data Telecommunications Network - 2000 (ADTN2000) provides Wide Area Network (WAN) service, both dedicated and dial-up, for worldwide connectivity between users, host computers and Local Area Networks (LANs) for interactive and bulk file transfer sessions. It is used for day-to-day agency business management (e.g. payroll, personnel, and e-mail) and to serve some National Airspace System (NAS) systems/applications designated as mission support.

Mechanism: Aeronautical Telecommunication Network Air to Ground Router (ATN A/G Router) [642]

The Aeronautical Telecommunications Network (ATN) Air to Ground Router (ATN A/G Router) provides air/ground data communication complying with International Civil Aviation Organization (ICAO) Annex 10 formats.

The ATN Program Office, AOS-900, entered into an agreement with the Japanese Civil Aviation Bureau (JCAB) on February 12, 1998. This agreement initiated trial and connectivity testing to implement ATN and the FAA owned ATS Message Handling System (AMHS) service to support the anticipated additional air traffic demands in the Asia/Pacific region. The FAA and JCAB successfully conducted connectivity and interoperability testing during 2001.

OKI Electric Industry Co. LTD (OKI) developed ATN router software for use by the JCAB air traffic control system. This unique and proprietary OKI software follows strict international aviation development guidelines and uses the Windows NT operating system. The FAA employed the OKI router software during successful compatibility and interoperability testing with JCAB in 2001 and it was found to meet all the desired technical and operational requirements. The FAA uses the OKI router software for the international data service component of ATN and if used in the U.S. will provide an economy of scale, operational efficiency, interoperability and commonality of equipment.

The FAA is required to obtain the software and support drivers in March 2003 to meet the integration and security processes needed for the initiation of the service with Japan. The agreement between the FAA and JCAB specifies the need to have the system deployed by August 2003 in order to initiate ATN service by March 2004.

Note: This router does not currently support NEXCOM, but could possibly be used as the ATN Backbone required in the future.

Mechanism: Air Traffic Services Interfacility Data Communications System (AIDCS) [706]

The Air Traffic Services Interfacility Data Communications System (AIDCS) provides ground-to-ground data link communications between U.S. Oceanic Air Traffic Control (ATC) centers and adjacent Flight Information Regions (FIRs). AIDCS is composed of a workstation processor and gateway router. The workstation serves as a translator between the National Airspace System (NAS) and the International Civil Aviation Organization (ICAO) formats for flight plans and coordination messages. The gateway router interfaces the workstation to the Oceanic Display and Planning System (ODAPS) Flight Data Processor and National Airspace Data Interchange Network II (NADIN II)/Aeronautical Fixed Telecommunications Network (AFTN).

Mechanism: Alaskan National Airspace System Interfacility Communications System (ANICS) [12]

Alaskan NAS Interfacility Communications System (ANICS) uses FAA-owned satellite earth stations and leased transponders on communications satellites to provide reliable telecommunication services. ANICS Phase I sites provide critical communications with 99.99% availability by using two sets of equipment and two satellites in parallel. ANICS Phase II sites will provide essential communications with 99.9% availability by using one set of equipment and one satellite. ANICS Phase II uses commercial off-the-shelf (COTS) equipment in a redundant configuration to provide high availability and reliability. Phase II sites are enclosed in radomes that protect the equipment and antenna from the weather. The ANICS equipment provides remote maintenance monitoring and control. The equipment is controlled and operated from the Network Operations Control Center (NOCC), centrally located in the Anchorage ARTCC.

Mechanism: Bandwidth Manager (BWM) [777]

Bandwidth Manager (BWM) provides capacity for multiple communication services and the ability to multiplex voice and data within the National Airspace System (NAS) telecommunications network. BW Mgr will enhance the NAS network capabilities by providing bandwidth-on-demand, automatic restoration, switching and intelligent routing of services between owned and/or leased services.

Mechanism: Data Multiplexing Network (DMN) [13]

The Data Multiplexing Network (DMN) mechanism multiplexes a number of independent data streams for consolidation into a single transmission channel. DMN equipment will work with a variety of transmission systems, such as analog and digital leased channels, voice-grade dial-up circuits, Radio Communications Link (RCL) channels, Low Density RCL, and satellites.

Mechanism: En Route Communications Gateway (ECG) [382]

The En Route Communications Gateway (ECG) replaces PAMRI and provides a modernized LAN-based infrastructure capable of accommodating ERAM with minimal modifications. The PAMRI functions to be replaces include providing communications interfaces to external systems located in other ARTCCs, TRACONs, AFSSs, ATCSCC, NORAD, US Law Enforcement, US Customs, Military Base Operations, and international ACCs. Other interfaces include the FDIO Central Control Unit, which exchanges FDIO data with FAA and DOD facilities, and the NADIN Concentrator, which exchanges data through the NADIN PSN with the the M1FC via WMSCR. ECG increases the number of external interfaces to radars from 24 to 36. ECG provides internal interfaces between HCS and DARC (or EBUS) and between HCS and traffic flow processors such as ETMS and DSP. ECG includes a Monitor and Control subsystem and a display for monitoring up to two dozen radars--called the Random Access Plan Position Indicator (RAPPI).

The operational components of ECG consist of a front end processor (communications and surveillance interfaces), two gateway processors (internal connectivity to HCS and DARC/EBUS), and separate LANs that communicate between the front end and gateway processors on the primary channel and between the front end and gateway processors on the backup channel. The primary data path, consisting of the ECG primary gateway and the HCS, operate on separate hardware platforms. However, the backup data path, consisting of the ECG backup gateway and the EBUS, will operate on the same hardware platform--the ECG gateway platform. This processor, with both functions performed therein, is renamed to the Backup Interface Processor (BIP). In essence, a single processor operates on the backup channel, supporting both the ECG gateway function and the EBUS function. These two functions will remain, however, as two mechanisms in the NAS architecture.

Mechanism: En Route Communications Gateway Tech Refresh (ECG Tech Refresh) (ECG Tech Refresh) [6389]

The En Route Communications Gateway Tech Refresh (ECG Tech Refresh) will enable ECG to accommodate ERAM. It will replace processors previously interfaced to HCS and EBUS with processors to be interfaced with ERAM primary and backup Application Infrastructure LANs. Whereas ECG previously did not pass flight data to the backup channel (DARC/EBUS), ECG must pass both surveillance and flight data to the backup channel of ERAM to enable full functionality on both channels of ERAM. To assure flight data is directed to only one channel at a time (not both), a new switching capability will be added to control the flow of flight data to either the primary or backup channel.

The ECG Tech Refresh will also accommodate new interfaces, including those previously provided by the HID NAS LAN for CPDLC, those previously provided by URET for interfacing with adjacent ARTCCs and with WARP, and those provided for interfacing with US Customs. Whereas the original ECG maintained legacy serial and parallel interfaces, the ECG Tech Refresh will (where possible) migrate from legacy interfaces to network interfaces, resulting in replacement of some serial and parallel interfaces. The ECG Tech Refresh will also provide a new Monitor and Control (M&C) sub-system for compatibility with the ERAM M&C and to assure successful integration with the future EMAC.

Mechanism: FAA Bulk Weather Telecommunications Gateway (FBWTG) [699]

The FAA Bulk Weather Telecommunications Gateway (FBWTG) provides the FAA interface to the National Weather Service (NWS) for the acquisition of gridded model weather forecasts and airborne weather observations (from the Meteorological Data Collection and Reporting System (MDCRS)) used by WARP and ITWS. It also provides a communications gateway for receiving weather advisories/information from the Aviation Weather Center in Kansas City, MO.

Mechanism: FAA Telecommunications Infrastructure (FTI) [639]

The FAA Telecommunications Infrastructure (FTI) services will replace most FAA-owned and leased telecommunications systems/services and consolidate their functions under a single service provider. The FTI contract will provide services that will meet current and future telecommunications requirements while reducing operational cost.

FTI is implemented in two phases. Phase 1 focuses on establishing an Internet Protocol (IP) backbone among 27 sites that includes ARTCCs, ATCSCC, Volpe, Aeronautical Center, WJHTC, and the two NADIN NNCC''s. Its primary goal is to transition 25 major nodes from the LINCS network. Phase 2 transitions circuits from DMN, BWM, NADIN PSN, and any remaining LINCS circuits.

FTI is a 15-year contract beginning in FY 2002 and ending in FY 2017.

Mechanism: Federal Aviation Administration Telecommunications Satellite (FAATSAT) [530]

The Federal Aviation Administration Telecommunications Satellite (FAATSAT) is a leased service alternative path for primary interfacility telecommunications circuits, using circuit diversity to avoid single point-to-point failure. FAATSAT serves the continental United States, Puerto Rico, Hawaii, and the Virgin Islands. The FAATSAT network management system consists of 21 FAA hub sites and 256 hub-linked remote sites. A System Management Terminal (SMT) at each hub site provides operators with a read-only regional display view of the status of the FAA network. A communications server at each hub site interfaces with all the devices within a hub region to provide fault, configuration, performance, and security management functionality to the Satellite Control Centers (SCCs) at McLean, Virginia, and Cary, North Carolina.

Mechanism: Federal Telecommunications System 2000 (FTS 2000) [505]

Federal Telecommunications System 2000 (FTS 2000) provides for a leased telecommunications services network to deliver long distance voice, facsimile, video, and data services in support of FAA administrative business operations. Alternative switching and routing services are also provided to support path diversity and backup for a portion of NAS air traffic control operations. FTS 2001 is a lease service vehicle that will continue the delivery of networking services to the NAS.

Mechanism: Federal Telecommunications System 2001 (FTS 2001) [629]

Federal Telecommunications System 2001 (FTS 2001) provides for a follow-on lease for Federal Telecommunications System 2000 functions. The telecommunications service contract that will provide administrative and National Airspace System (NAS) telecommunications support for the FAA. FTS 2001 will provide long distance voice, facsimile, video, and data services.

Mechanism: High Frequency Aeronautical Telecommunictions Network Data Link (HF ATN DL) [785]

The High Frequency Aeronautical Telecommunications Network Data Link (HF ATN DL) provides two-way digital data communications over HF radios using International Civil Aviation Organization (ICAO) - compliant ATN digital data link applications in the transoceanic domain.

The FAA has no plans to develop its own HF ATN Data Communications system.

Mechanism: Interfacility Communications (Interfacility Comm) [694]

The Interfacility Communications (Interfacility Comm) includes all ground-to-ground communications systems connecting FAA facilities.

Mechanism: Leased Inter-facility National Airspace System Communication System (LINCS) [67]

The Leased Inter-facility National Airspace System Communication System (LINCS) provides transmission channels of various industry-standard types between any specified end points, used to satisfy all FAA operational and some administrative telecommunication requirements.

Mechanism: Low-Density Radio Communications Link (LDRCL) [66]

The Low-Density Radio Communications Link (LDRCL) is an FAA owned Low-Density Radio Communications Link (LDRCL) satisfies short-haul, low-density communication requirements. It provides user access (via tail circuits) to a Radio Communications Link (RCL) site or connectivity between two operational facilities

Mechanism: Mike Monroney Aeronautical Center Telecommunications (MMAC Telecommunications) [2203]

The Mike Monroney Aeronautical Center Telecommunications (MMAC Telecommunications) mechanism includes: (1) the MMAC Backbone Data Network which is a Local Area Network (LAN) that connects 25 buildings and over 5,000 workstations on the MMAC campus; (2) a digital telephone system that provides digital telephones, analog lines and telephones, voice mail services, and automated call distribution capabilities and (3) the MMAC cable/fiber plant that provides the appropriate connectivity for voice, data, security, and building monitoring equipment among buildings located at the MMAC.

Mechanism: National Airspace Data Interchange Network Message Switch Network (NADIN MSN) [61]

The National Airspace Data Interchange Network Message Switch Network (NADIN MSN) (sometimes called NADIN 1A) is an integrated store-and-forward telecommunications system consisting of message-switched networks, accessed by remote concentrators. NADIN MSN provides flight plan, weather, and Notice to Airmen (NOTAM) information, and meets the International Civil Aviation Organization (ICAO) requirements for Aeronautical Fixed Telecommunications Network (AFTN) support.

Mechanism: National Airspace Data Interchange Network Packet Switch Network (NADIN PSN) [21]

The National Airspace Data Interchange Network Packet Switch Network (NADIN PSN) (sometimes called NADIN II) is an X.25 packet-switched network that augments and functions in parallel with the National Airspace Data Interchange Network Message-Switched Network (NADIN MSN). Collectively, both networks are known as NADIN. The NADIN PSN is a data communications network composed of packet-switching nodes connected by high-speed digital backbone trunks and controlled by the National Network Control Center (NNCC).

Mechanism: Next Generation Messaging (NEXGEN Messaging) [2199]

The Next Generation Messaging (NEXGEN Messaging) program is the Federal Aviation Administration''s enterprise-wide messaging system with a 10-year life-cycle. NexGen currently serves approximately 43,000 messaging users with twelve message stores located at the nine regional offices, the two centers, and at headquarters. NexGen provides support through a three-tier system, which includes 1,200 local support personnel, 12 Regional Messaging Administration Teams, and 24/7 National Help Desk.

Mechanism: Peripheral Adapter Module Replacement Item (PAMRI) [10]

The Peripheral Adapter Module Replacement Item (PAMRI) is an interface peripheral to the HOCSR. It provides a conduit through which the HOCSR receives and exchanges data, primarily radar data, flight data and interfacility data. The PAMRI converts communication protocols and translates data formats so the Host and EDARC can communicate with external devices.

Mechanism: Radio Communication Link (RCL) [22]

Radio Communication Link (RCL) is an integrated voice and data microwave transmission system designed to provide the FAA with cost effective and reliable service for its high capacity NAS communications routes. RCL interconnects air route traffic control center (ARTCC) facilities with long range radar installations and other air traffic control (ATC) facilities.

Mechanism: Radio Control Equipment (RCE) [31]

Radio Control Equipment (RCE), located at both ATC facilities and remote communication sites, control the operation of remotely located ground to air Very High Frequency/Ultra High Frequency (VHF/UHF) radios used by air traffic controllers to communicate with pilots. RCE interfaces with the voice switch at the ATC facility, telephone landlines, and ground to air radios at the En Route Remote Communications Air/Ground (RCAG) sites, Terminal Remote Transmitter/Receiver (RTR) sites, and Flight Service Station Remote Communications Outlet (RCO) sites.

Mechanism: Weather Message Switching Center Replacement (WMSCR) [272]

The Weather Message Switching Center Replacement (WMSCR) is the primary National Airspace System (NAS) interface with the National Weather Service (NWS) Telecommunications Gateway (NWSTG) for the exchange of aviation alphanumeric and limited gridded weather products. WMSCR collects, processes, stores, and disseminates aviation weather products to major NAS systems, the airlines, and international and commercial users. WMSCR also provides storage and distribution of domestic Notice To Airmen (NOTAM) data and retrieval of international NOTAMs through the Consolidated NOTAM System (CNS).

Mechanism: Weather Message Switching Center Replacement (WMSCR) Sustain (WMSCR Sustain) [1676]

The Weather Message Switching Center Replacement (WMSCR) sustainment activity will sustain the existing WMSCR functionality of distributing alphanumeric weather text and NOTAM products through a hardware and software upgrade program. This upgrade program will consist of Commercial-off-the-Shelf processors, physical disk drives, workstations, network routers, printer, operating system, High Order Language programming software, and other commercially available software packages.

Domain: Air Traffic Control Navigation

Lighting

Mechanism: Approach Light System with Sequenced Flashers Next Generation (ALSF NexGen) [6456]

Approach Lighting System with Sequenced Flashers Next Generation (ALSF NexGen) is a 2400-foot long array of high intensity Light Emitting Diode (LED) lamps and flashers located on the final approach to a runway and are provided to support Category II and III instrument approaches. The ALSF NexGen systems assist''s pilot''s transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

These systems are installed at new locations so they will not replace the existing ALSF-2 Tech Refresh systems.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 (ALSF-2) [214]

Approach Lighting System with Sequenced Flashers, Model 2 (ALSF-2) is a 2400 foot long array of high intensity incandescent lamps and flashers located on the final approach to a runway and are provided to support Catetory II and III instrument approaches. The ALSF-2 assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

These ALSF-2 systems represent the current acquisition of NBP type systems.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 First Generation (ALSF-2 First Gen) [6418]

Approach Lighting System with Sequenced Flashers, Model 2 (ALSF-2) First Generation is the older Godfrey, Airflo, and other systems first deployed in the 1970s. It is a 2400 foot long array of high intensity incandescent lamps and flashers located on the final approach to a runway and are provided to support Catetory II and III instrument approaches. The ALSF-2 assists pilots transition from low visibility Instrument Meteorological Conditions (IMC) to visual conditions for landing. A row of green lights marks the runway threshold.

Mechanism: Approach Lighting System with Sequenced Flashers Model 2 Technological Refresh (ALSF-2 Tech Refresh) [216]

The Approach Lighting System with Sequenced Flashers Model 2 (ALSF-2) is a dual-mode system with 219 lamps that can be re-configured as a 50-light Simplified Short Approach Lighting system with Runway alignment lights (SSALR) to meet reduced approach lighting requirements. The ALSF-2 will support Category II and Category III precision landings and the SSALR will support Category I precision landings. The ALSF-2 tech refresh will utilize technology available in the procurement timeframe.

Mechanism: Approach Lighting System with Sequenced Flashing Lights Model 1 (ALSF-1) [2212]

The Approach Lighting System with Sequenced Flashing Lights Model 1 (ALSF-1) is a system of high-intensity lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. A row of green indicators mark the runway threshold.

ALSF-1 are very old systems and, when funded, will be replaced with current technology MALSR or ALSF-2 systems depending on whether the runway will support Cat I instrument approaches (MALSR) or Cat II/III instrument approaches (ALSF-2).

Mechanism: Lead-in-light System (LDIN) [2306]

A Lead-in-light System (LDIN) consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

Mechanism: Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) [184]

The Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) supports Category I instrument approaches. It is a medium intensity light system that identifies the extended runway centerline from threshold to 2,400 feet before the threshold. The MALSR supports Category I instrument approaches and presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point approximately 1,400 feet from the end of the runway. A row of green lights marks the threshold of the runway.

MALSF and MALS are subsets of MALSR. A MALSR has 45 lights, 5 flashers, and is 2400 ft in length. A MALSF has 45 lights, 3 flashers, and is 1400 ft in length. MALS has 45 lights, no flashers, and is 1400 ft in length.

Mechanism: Medium-Intensity Approach Light System with Runway Alignment Indicator Lights Next Generation (MALSR NEXGEN) [2223]

The Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (RAIL) Next Generation (MALSR NEXGEN) is an array of medium-intensity lights marking the extended runway centerline for approaching aircraft. The RAIL begins 2400 feet from threshold and extends 1000 feet. The MALSR supports Category I instrument approaches and presents the illusion of a ball of light leading towards the runway. The MALS portion of the MALSR begins 1400 feet from threshold and ends 200 feet from threshold. A row of green lights marks the threshold of the runway.

Mechanism: Medium-Intensity Light System with Runway Alignment Indicator Lights Technology Refresh (MALSR Tech Refresh) [2134]

The Medium-Intensity Light System with Runway Alignment Indicator Lights Technology Refresh (MALSR Tech Refresh) is an array of high intensity Light Emitting Diode (LED) lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. The MALSR supports Category I instrument approaches and presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point about 1,400 feet from the end of the runway. An indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold of the runway.

Mechanism: Omnidirectional Approach Lighting System (ODALS) [185]

The Omnidirectional Approach Lighting System (ODALS) is a system of sequenced flashing lights marking the extended runway centerline for 1,500-feet.

Indicators placed at the end of the runway mark each edge of the runway.

Mechanism: Precision Approach Path Indicator (PAPI) [187]

The Precision Approach Path Indicator (PAPI) provides precision visual glide slope guidance to pilots landing in Visual Flight Rules (VFR) conditions. The PAPI consists of four sharp transition projector units located on one side of the runway, spaced laterally at 29.5-foot intervals.

Mechanism: Precision Approach Path Indicator Next Generation (PAPI NEXGEN) [6338]

The Precision Approach Path Indicator Next Generation (PAPI NEXGEN) provides precision visual glide slope guidance to assist pilots in landing. The PAPI consists of four sharp transition projector units located on one side of the runway, spaced laterally at 29.5-foot intervals.

Mechanism: Runway Alignment Indicator Lights (RAIL) [2307]

Runway Alignment Indicator Lights (RAIL) are a series of sequenced flashing lights that are installed only in combination with other lighting systems.

Mechanism: Runway Centerline Lighting (RWCLL) [2305]

Runway Centerline Lighting (RWCLL) consists of flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

Mechanism: Runway End Identifier Lighting (Next Generation) (REIL (Nexgen)) [2462]

Runway End Identifier Lights (REIL) (Next Generation) is the next generation of an airport lighting facility in the terminal area navigation system, consisting of one flashing white high intensity light installed at each approach end corner of a runway and directed towards the approach zone, which enables the pilot to identify the approach end of the runway.

Mechanism: Runway End Identifier Lights (REIL) [188]

Runway End Identifier Lights (REIL) is an airport lighting system consisting of two flashing, white, high intensity lights located at each approach end corner of a runway. The REILs are directed towards the approach zone to enable pilots to identify the end of the runway.

Mechanism: Runway Lights/Runway Edge Lights (RL/REL) [2304]

Runway Lights/Runway Edge Lights (RL/REL) are lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200-feet, and the intensity may be controlled or preset.

Runway lights and ruuway edge lights are procured, installed, and maintained by the airport. The FAA is not involved with these light systems other than publishing the necssary lighting standards which the airport uses for guidance.

Mechanism: Short Approach Lighting System (SALS) [2213]

A Short Approach Lighting System (SALS) is an array of high-intensity lights marking the extended runway centerline for 2,400 to 3,000 feet from the runway threshold. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point 1,000 feet from the end of the runway. Two additional rows of lights indicate the edges of the runway for the last 1,000 feet with special indicators placed 1,000 feet, 500 feet and at the runway threshold.

Mechanism: Short Approach Lighting System with Sequenced Flashing Lights (SALSF) [2214]

Short Approach Lighting System with Sequenced Flashing Lights (SALSF) is an array of high intensity lights marking the extended runway centerline for 1,500 feet. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point 1,000 feet from the end of the runway. Indicators placed at the end of the runway mark the center and each edge of the runway. An additional indicator marks a point 1,000 feet from the end of the runway.

Mechanism: Simplified Short Approach Light System with Runway Alignment Indicator Lights (SSALR) [190]

The Simplified Short Approach Light System with Runway Alignment Indicator Lights (SSALR) is a SSALS facility with sequence flashers installed from 1,600 to 2,400 feet from the runway threshold. Normal spacing between lights is 200 feet. This system assists pilots in transitioning from precision approach Instrument Flight Rules (IFR) to Visual Flight Rules (VFR) for landing.

Mechanism: Simplified Short Approach Lighting System (SSALS) [2215]

The Simplified Short Approach Lighting System (SSALS) is an array of medium-intensity lights marking the extended runway centerline for 1,400 feet. A special indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold runway.

Mechanism: Simplified Short Approach Lighting System with Sequenced Flashing Lights (SSALF) [2216]

The Simplified Short Approach Lighting System with Sequenced Flashing Lights (SSALF) is a system of medium-intensity lights marking the extended runway centerline for 1,400 feet. The system presents to the pilot the illusion of a ball of light traveling from the outer end of the system (1,400 feet) to a point 1,000 feet from the end of the runway. A special indicator marks a point 1,000 feet from the end of the runway. A row of green lights indicates the threshold runway.

Mechanism: Touchdown Zone Lighting (TDZL) [2308]

A Touchdown Zone Lighting (TDZL) consists of two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Mechanism: Visual Approach Slope Indicator (VASI) [192]

A Visual Approach Slope Indicator (VASI) system is a light system that is accurately located alongside a runway to provide a visual glide slope to landing aircraft. VASIs radiate a directional pattern of high intensity, red and white focused light beams to form the glide path and are utilized primarily under Visual Flight Rules (VFR) conditions.

Signage/Markings Navigation

Signal-in-Space Navigation

Mechanism: Direction Finder (DF) [196]

Direction Finder (DF) is a VHF/UHF radio receiver equipped with a antenna capable of detecting the direction to an aircraft radiating a Radio Frequency (RF) tone. DFs are used to establish a "direction fix" for pilots requesting orientation assistance.

Mechanism: Distance Measuring Equipment (DME) [653]

Distance Measuring Equipment (DME) is a UHF (Ultra High Frequency) ground-based radio navigation aid. DME avionics transmit interrogation pulses, and the ground-based responder sends a reply. The avionics process the reply and determine the slant range between the aircraft and the ground station. Separate funding segments and acquisition projects have been established for two generic classes of DME ground stations: High power (en route) DMEs, and low power (terminal) DMEs. This mechanism addresses the high power DMEs.

DMEs may be provided alone, but are more often collocated with a VOR to form a VOR/DME facility, allowing aircraft to determine both the bearing and slant range to the ground station - and hence a navigational position fix. DMEs are approved as a primary navigation system in the NAS. The DME function is frequently provided by the TACAN system that also provides azimuth guidance to military users. (DME and the distance-measuring portion of TACAN are functionally the same.) When combined with a VOR, these facilities are called VORTACs.

The DME network will be sustained to support en route navigation and to serve as an independent backup navigation source to GPS and GPS/WAAS. The DME network may also need to be expanded to provide a redundant area navigation (RNAV) capability for terminal area operations at major airports.

Mechanism: Distance Measuring Equipment Replacement (DME Replacement) [6373]

Distance Measuring Equipment (DME) is a UHF (Ultra High Frequency) ground-based radio navigation aid. DME avionics transmit interrogation pulses, and the ground-based responder sends a reply. The avionics process the reply and determine the slant range between the aircraft and the ground station. Separate funding segments and acquisition projects have been established for two generic classes of DME ground stations: High power (en route) DMEs, and low power (terminal) DMEs. This mechanism addresses only the the high power DMEs.

DMEs may be provided alone, but are more often collocated with a VOR to form a VOR/DME facility, allowing aircraft to determine both the bearing and slant range to the ground station - and hence a navigational position fix. DMEs are approved as a primary navigation system in the NAS. The DME function is frequently provided by the TACAN system that also provides azimuth guidance to military users. (DME and the distance-measuring portion of TACAN are functionally the same.) When combined with a VOR, these facilities are called VORTACs. The DME network will be sustained to support en route navigation and to serve as an independent backup navigation source to GPS and GPS/WAAS. The DME network may also need to be expanded to provide a redundant area navigation (RNAV) capability for terminal area operations at major airports.

This mechanism replaces aging high power DME facilities through either a service life extension program (SLEP) or outright replacement.

Mechanism: Global Positioning System (GPS) [180]

The Global Positioning System (GPS) is a worldwide, all-weather, satellite-based navigation system developed, maintained & operated by the U.S Department of Defense, and managed by an Interagency executive board. GPS is a (nominal) 24 satellite constellation orbiting at approximately 12,000 miles above the earth in six planes. Each satellite broadcasts a precisely timed L-band signal on the same frequency. User GPS receivers, oboard aircraft, in ground vehicles or hand-held, receive and process the signals from all satellites in view, with a minimum of four satellites necessary to determine the receiver''s three-dimensional position (i.e., latitude, longitude and altitude), velocity (if applicable) and the precise time of day. GPS equipped aircraft can navigate on published jetways or utilize Area Navigation (RNAV) to fly any desired course between two locations.

GPS avionics built to TSO C-129 support en route and terminal area navigation, as well as non-precision instrument approach operations. Approval has been granted for properly certified GPS avionics to be used as a primary means of navigation in oceanic airspace and in certain remote areas. In July 2003 the Wide Area Augmentation System (WAAS)was commissioned to augment the GPS signal to meet primary navigation service requirements for accuracy, coverage, availability, and integrity.

Mechanism: Instrument Landing System Category I (ILS CAT I) [199]

Category (CAT) I Instrument Landing Systems (ILS) support precision landing operations for visibility conditions equal to or greater than a 200 feet decision height above the runway threshold and a touchdown zone runway visual range of at least 1,800 feet.

All ILS radiate runway approach guidance, i.e., alignment and descent information, to aircraft on final approach to a runway. Equipment-wise an ILS consists of a highly directional localizer located at the far end of the runway, a glide slope located near, and offset from, the approach end of the runway. Marker beacons located along the runway''s approach course provide visual and aural indications in the cockpit that indicate the aircraft''s distance from the runway threshold. Marker beacons can be supplanted or replaced by Distance Measuring Equipment (DME) that is typically co-located with the localizer station. The presence and utilization of a DME to aid in making a precision approach is included in the approach procedure for the runway.

ILS feature integral monitoring of the radiated signals to ensure that the radiated guidance is within specified operating tolerances to ensure the signal-in-space approach guidance is safe. They also possess remote maintenance monitoring (RMM) to support remote access and monitoring of the operating status of each ILS station.

Mechanism: Instrument Landing System Category I Replacement (ILS CAT I Rpl) [6347]

Provides lateral (azimuth) and vertical (glide slope) guidance to aircraft during precision approach. Supports Category I (CAT I) aircraft landing operations.

CAT I service may eventually be provided by WAAS and/or LAAS at many airports. Until then, service will continue to be provided by ILS technology. This program replaces aging ILS systems through either SLEP or outright replacement.

Mechanism: Instrument Landing System Category II/III (ILS CAT II/III) [200]

Category (CAT) II Instrument Landing Systems (ILS) support precision landing operations for 100 foot decision heights and a touchdown zone runway visual range (RVR) of at least 1200 feet. CAT III ILS support precision approaches with decision heights of 50 or less feet and touchdown zone RVR less than 700 feet.

All ILS radiate runway approach guidance, i.e., alignment and descent information, to aircraft on final approach to a runway. Equipment-wise an ILS consists of a highly directional localizer located at the far end of the runway, a glide slope located near, and offset from, the approach end of the runway, and marker beacons located along the approach course that provide visual and aural information on how far the aircraft is from the runway threshold. ILS marker beacons can be supplanted or replaced by Distance Measuring Equipment (DME) that is typically co-located with the localizer station. The presence and utilization of a DME to aid in making a precision approach is included in the approach procedure for the runway.

ILS feature integral monitoring of the radiated signals to ensure that the radiated guidance is within specified operating tolerances to ensure the signal-in-space approach guidance is safe. They also possess remote maintenance monitoring (RMM) to support remote access and monitoring of the operating status of each ILS station.

The Local Area Augmentation System (LAAS) may eventually support CAT II/III service. In the interim precision landing services will continue to be provided using ILS technology, which requires that the older population of the current ILS inventory must be either replaced or upgraded (modernized) via a service life extension program.

Mechanism: Instrument Landing System Category II/III Replacement (ILS CAT II/III Rpl) [6348]

Provides lateral (azimuth) and vertical (glide slope) guidance to aircraft during precision approach. Supports Category II/III (CAT II/III) aircraft landing operations.

CAT II/III service may eventually be provided by LAAS. Until then, service will continue to be provided by ILS technology. This program replaces aging ILS systems through either SLEP or outright replacement.

Mechanism: Local Area Augmentation System Category I (LAAS CAT I) [181]

The Local Area Augmentation System Category I (LAAS CAT I) is a safety-critical precision navigation and landing system that augments Global Positioning System (GPS)range data to provide aircraft position accuracy necessary for CAT I precision approaches; i.e., 200 foot decision height and one-half mile visibility. LAAS will provide service to suitably equipped users for runways equipped with required peripheral systems; e.g., Approach zone Runway Visual Range (RVR) and Approach Lighting System (ALS). The LAAS signal-in-space will provide: (1) local area differential corrections for GPS satellites and WAAS Geostationary Earth Orbit (GEO) satellites; (2) the associated integrity parameters; and (3) the path points that describe the final approach segment.

The LAAS CAT I will utilize multiple GPS reference receivers and their associated antennas, all located within the airport boundary, to receive and decode the GPS and WAAS GEO range measurements and navigation data. The LAAS information is broadcast to aircraft operating in the local terminal area (nominally 20 nautical miles (nmi)) via a LAAS very high frequency (VHF) data broadcast (VDB) transmission.

Mechanism: Local Area Augmentation System Category I Technological Refresh (LAAS CAT I Tech Refresh) [2063]

LAAS CAT I Tech Refresh periodically (5-7 years) replaces Line Replaceable Units (LRUs) that lifecycle engineering analyses determine will become unsupportable. Tech Refresh will not increase the LAAS'' functionality.

Mechanism: Local Area Augmentation System Category II/III (LAAS CAT II/III) [500]

The CAT II/III Local Area Augmentation System (LAAS) will provide guidance that meets the accuracy, integrity and availabililty requirements for CAT II and III precision approaches. The Wide Area Augmentation System (WAAS) and LAAS will provide a seamless satellite-based navigation capability for all phases of flight.

CAT II/III LAAS is an ongoing R&D effort which, if successful, is envisioned to lead to a follow-on development and procurement program. CAT II/III LAAS installations might ultimately complement or replace the CAT II/III Instrument Landing Systems (ILS) that are currently in the NAS.

LAAS consists of a precisely surveyed ground station with multiple Global Positioning System (GPS) receivers, a very high frequency (VHF) radio data broadcast (VDB), and possibly one or more pseudolites to increase availability. The LAAS ground station will receive, process, and communicate differential correction information, together with an integrity message, to aircraft avionics within a nominal radius of 20 to 30 nautical miles from the airport.

Pseudolite ground-based transmitters that transmit GPS-like signals may be required to ensure the LAAS performs to CAT II/III requirements. Peudolites can be used as a data link (to transmit differential corrections and integrity status to user platforms) and as supplementary ranging sources for LAAS. Pseudolites used as ranging sources can improve system accuracy by improving the local constellation geometry and system availability.

Mechanism: Local Area Augmentation System Category II/III Technological Refresh (LAAS CAT II/III Tech Refresh) [2130]

LAAS CAT II/III Tech Refresh periodically (5-7 years) replaces Line Replaceable Units (LRUs) that lifecycle engineering analyses determine will become unsupportable. Tech Refresh will not increase the LAAS" functionality.

Mechanism: Localizer (LOC) [2183]

The component of an ILS that provides lateral course guidance to the runway. Localizer will provide non-precision approach capability with appropriate lead-in lights.

Mechanism: Localizer Type Directional Aid (LDA) [2326]

The Localizer-type Directional Aid (LDA) is of comparable use and accuracy to a localizer but is not part of a complete ILS. The LDA course usually provides a more precise approach course than the similar Simplified Directional Facility (SDF) installation, which may have a course width of 6 or 12 degrees.

The LDA is not aligned with the runway. Straight-in minimums may be published where alignment does not exceed 30 degrees between the course and runway. Circling minimums only are published where this alignment exceeds 30 degrees.

Mechanism: Loran-C (Loran-C) [182]

Loran-C is a low frequency (LF), long-range, ground-based radionavigation aid operated by the U.S. Coast Guard. Loran-C avionics measure the time difference between signals received from three or more ground stations and determine the two-dimensional position (i.e., latitude and longitude) and velocity of the aircraft. Loran-C avionics provide an Area Navigation (RNAV) capability that permits operation on any desired course within the coverage area of the stations being used.

Loran-C is currently approved as a supplemental system in the National Airspace System (NAS), meaning that it must be used in conjunction with a primary system. Current Loran-C avionics support en route navigation but do not support instrument approach operations.

Operation of Loran-C beyond 2008 will be based upon a determination by the Department of Transportation and the Department of Homeland Security whether the system is needed as a backup to GPS for transportation and timing applications.

Mechanism: Low Power Distance Measuring Equipment (LPDME) [2225]

Distance Measuring Equipment (DME) is an Ultra High Frequency (UHF) ground-based radio-navigation aid. DME avionics reply to interrogations from the ground station, which is capable of processing replies from over 100 aircraft at one time. The DME determines the time between an interrogation and a reply to determine the slant range between them.

Acquisition projects have been established for two generic classes of DME ground stations: high power and low power. High power DMEs (HPDMEs)are rated at 1kw and are located to support enroute navigation. HPDMEs are typically co-located with VHF OmniRange systems, forming what is termed a VOR/DME facility. Low power DMEs (LPDMEs) are rated at 100w and are located to support terminal area navigation such as ILS approaches.

LPDMEs are installed with many ILS facilities. When specified in the ILS approach procedure, DME may be used in lieu of the outer marker, as a back-course final approach fix, or to establish other fixes on the localizer course. LPDMEs are also installed with some localizer-only (LOC) facilities. Additional LPDMEs are being installed to support ILS approaches as recommended by the Commercial Aviation Safety Team (CAST).

Mechanism: Microwave Landing System (MLS) [197]

. The MLS provides precision navigation guidance for exact alignment and descent of aircraft on approach to a runway. It provides azimuth, elevation, and distance.2. Both lateral and vertical guidance may be displayed on conventional course deviation indicators or incorporated into multipurpose cockpit displays. Range information can be displayed by conventional DME indicators and also incorporated into multipurpose displays.3. The MLS supplements the ILS as the standard landing system in the United States for civil, military, and international civil aviation. At international airports, ILS service is protected to 2010.4. The system may be divided into five functions: (a) Approach azimuth, (b) Back azimuth, (c) Approach elevation, (d) Range, and (e) Data communications.5. The standard configuration of MLS ground equipment includes: (a) An azimuth station to perform functions (a) and (e) above. In addition to providing azimuth navigation guidance, the station transmits basic data, which consists of information associated directly with the operation of the landing system, as well as advisory data on the performance of the ground equipment. (b) An elevation station to perform function (c). (c) Distance Measuring Equipment (DME) to perform range guidance, both standard DME (DME/N) and precision DME (DME/P).6. MLS Expansion Capabilities: The standard configuration can be expanded by adding one or more of the following functions or characteristics. (a) Back azimuth: Provides lateral guidance for missed approach and departure navigation. (b) Auxiliary data transmissions: Provides additional data, including refined airborne positioning, meteorological information, runway status, and other supplementary information. (c) Expanded Service Volume (ESV) proportional guidance to 60 degrees.7. MLS identification is a four-letter designation starting with the letter M. It is transmitted in International Morse Code at least six times per minute by the approach azimuth (and back azimuth) ground equipment.b. Approach Azimuth Guidance1. The azimuth station transmits MLS angle and data on one of 200 channels within the frequency range of 5031 to 5091 MHz.2. The equipment is normally located about 1,000 feet beyond the stop end of the runway, but there is considerable flexibility in selecting sites. For example, for heliport operations the azimuth transmitter can be collocated with the elevation transmitter.3. The azimuth coverage extends: (a) Laterally, at least 40 degrees on either side of the runway centerline in a standard configuration, (b) In elevation, up to an angle of 15 degrees and to at least 20,000 feet, and(c) In range, to at least 20 NM.

Mechanism: Non-Directional Beacon (NDB) [194]

Non-Directional Beacons (NDB) are low frequency (LF) or medium frequency (MF) ground-based radio navigation aids that broadcast a continuous wave (CW) signal with a Morse code identification on an assigned frequency signal. NDBs are used by pilots to determine the aircraft"s bearing to the ground station. Some state-owned and locally owned NDBs are also used to provide weather information to pilots.

NDBs can be used for non-precision approaches at low traffic airports, as compass locators (locator outer markers (LOMs)) to aid a pilot in finding the initial approach point of an Instrument Landing System (ILS), and for en route operations in remote areas. NDBs are approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Non-Directional Beacon Replacement (NDB Rpl) [6349]

tbd

Mechanism: Simplified Directional Facility (SDF) [2327]

Simplified Directional Facility (SDF) is a navigational aid (NAVAID) used for nonprecision instrument approaches. The final approach course is similar to that of an Instrument Landing System (ILS) localizer for lateral guidance to the approach procedure decision threshold. However, the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy. A glide slope path is not provided. The SDF signal is fixed at either 6 degrees or 12 degrees as necessary to provide maximum flyability and optimum course quality. Identification consists of a three-letter identifier transmitted in Morse code on the SDF frequency. The appropriate instrument approach chart will indicate the identifier used at a particular airport. The SDF transmits signals within the range of 108.10 to 111.95 MHz. The approach techniques and procedures used in an SDF instrument approach are essentially the same as those employed in executing a standard localizer approach except the SDF course may not be aligned with the runway and the course may be wider, resulting in less precision.

Mechanism: Tactical Air Navigation System (TACAN) [2182]

Tactical Air Navigation (TACAN) is a UHF (ultra high frequency) ground-based radio navigation aid that is the military counterpart of VHF Omnidirectional Range co-located with Distance Measuring Equipment (VOR/DME). TACAN avionics provide both the bearing and slant range to the ground station. TACAN is often collocated with civil VOR systems to form a VORTAC to support both civil and military flight operations. TACAN is approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Tactical Air Navigation System Replacement (TACAN Rpl) [6345]

Tactical Air Navigation (TACAN) is a UHF (ultra high frequency) ground-based radio navigation aid that is the military counterpart of VHF Omnidirectional Range/Distance Measuring Equipment (VOR/DME). It is the primary tactical air navigation system for the military services ashore and afloat. TACAN avionics provide both the bearing and slant range to the ground station - and hence a navigational position fix. Many avionics models include an air-to-air mode that enables aircraft to determine distance from each other, which can be particularly useful in rendezvous operations. TACAN is often collocated with civil VOR stations (Denoted as VORTAC facilities) to permit military aircraft to operate in civil airspace. TACAN is approved as a primary navigation system in the National Airspace System (NAS).

Mechanism: Transponder Landing System (TLS) [1407]

The TLS is intended for private use only, no public procedures will be issued. The TLS is designed to provide approach guidance utilizing existing avionics: ILS localizer/glide slope and Mode 3 transponders. TLS special procedures require pilot training and limit operations to one aircraft approach at a time. Ground equipment consists of a transponder interrogator, sensor arrays to detect lateral and vertical position, and ILS frequency transmitters. The TLS detects the aircraft""s vertical and azimuth position by processing its transponder replies into appropriate localizer and glide slope signals which are broadcast to and displayed on the aircraft""s Course Deviation Indicator. The TLS broadcast guides the aircraft on the proper course and glide path to the approach decision height.

Mechanism: Very High Frequency Omnidirectional Range (VOR) [211]

The Very High Frequency Omnidirectional Range (VOR) is a ground-based radio navigation aid that broadcasts azimuth information to aircraft. VORs broadcast on assigned channels and include the facility identification in Morse code for pilot monitoring and verification. Some VORs are capable of broadcasting weather information and supporting pilot-controller communcations although these capabilities are typically provided by other infrastructure systems. In addition to providing en route and terminal area azimuth guidance, VORs also support nonprecision instrument approach operations.

Currently, VORs are the primary radio navigation aid in the National Airspace System (NAS). They serve as the internationally designated standard short-distance radio navigation aid for air carrier and general aviation Instrument Flight Rules (IFR) operations.

VORs may be installed stand-alone or co-located with either a DME or TACAN system. When co-located the facility is typically referred to as a VOR/DME or VORTAC facility, respectively. This configuration allows pilots to determine their aircraft"s bearing and distance to a single location, i.e., fix.

With the advent of space-based navigation capabilities, a planned reduction in operational VORs will begin in approximately 2010. The reduction will result in a "backbone" minimum operational network (MON) that will support IFR operations at the busiest airports in the NAS while serving as a backup for space-based navigation.

Mechanism: Very High Frequency Omnidirectional Range Replacement (VOR Rpl) [6346]

The Very High Frequency Omnidirectional Range (VOR) system is a ground-based radio navigation aid that broadcasts navigation signals, 360 degrees in azimuth, oriented from magnetic north, plus a periodic Morse code identification signal. VOR avionics indicate the azimuth (bearing) to or from the VOR transmitter. Some VOR stations are used for the broadcast of weather information. Air Traffic Control (ATC) or Flight Service Station (FSS) specialists may use the voice features for transmitting instructions or information to pilots.

VOR is the primary radio navigation aid in the National Airspace System (NAS) and is the internationally designated standard short-distance radio navigation aid for air carrier and general aviation Instrument Flight Rules (IFR) operations. Because it forms the basis for defining the airways, its use is an integral part of the ATC procedures. In addition to providing en route and terminal area guidance, VORs also support nonprecision instrument approach operations.

VORs may be provided alone, but are more often collocated with either a DME or TACAN system to form a VOR/DME or VORTAC facility, allowing aircraft to determine both the bearing and distance to the ground station - and hence a navigational position fix.

The number of VOR systems shown herein includes all systems whether stand-alone or co-located with an NDB, DME or TACAN system.

A reduction in the VOR (only) population is expected to begin in 2010. The proposed reduction will transition from todays VOR services to a minimum operational network (MON) that will support IFR operations at the busiest airports and serve as an independent backup navigation source to GPS and GPS/WAAS. Those VORs that remain in service will need to be replaced or SLEPd, as portrayed in the quantities depicted in this mechanism.

Mechanism: Very High Frequency Omnidirectional Range Test (VOT) [198]

A ground facility, which emits a test signal to check VOR receiver accuracy. Some VOTs are available to the user while airborne, and others are limited to ground use only. The airborne use of VOT is strictly limited to those areas/altitudes specifically authorized in the A/FD or appropriate supplement.

Mechanism: WAAS Corrections Broadcast Service (WAAS Corrections Broadcast Service) [631]

Wide Area Augmentation System (WAAS) ground uplink stations transmit GPS range correction information and data integrity messages to Geostationary Earth Orbit (GEO) satellites which re-transmit the data for use by WAAS-equipped users. Airborne or terrestrial users use the correction information to accurately determine their 3-dimensional position for very accurate navigation or location purposes.

Mechanism: Wide Area Augmentation System (WAAS) [561]

The Wide Area Augmentation System (WAAS) consists of a distributed array of Reference and Master Stations designed to provide range correction and integrity information messages that are used by WAAS-capable Global Positioning System (GPS)avionics to accurately determine an aircraft"s 3-dimensional position in space. Accurately surveyed WAAS Reference Stations (WRS) receive and process GPS satellite range data which is forwarded to redundant WAAS Master Stations (WMS) for additional processing before sending the resulting range-correction data to redundant WAAS Ground Uplink Stations (GUS). The GUS transmit the data to Geostationary (GEO) satellites which retransmit them on a GPS civil-use frequency for reception by GPS/WAAS avionics. The WAAS data enables aircraft to determine their position in the airspace with an accuracy that will enable, for WAAS-equipped aircraft, introduction of advanced navigation initiatives such as precision and non-precision approaches to airports throughout the NAS, and reduced longitudinal separation.

The WAAS service volume includes the contiguous United States, Hawaii, portions of Alaska and the Caribbean, and the US border areas with Canada and Mexico. Planned enhancement of WAAS with additional WRS and GEO satellites will improve the coverage and availability of WAAS. Enhancement of the GPS by the Department of Defense (DoD) will provide a second civil frequency for WAAS that will provide additional improvements in navigation performance throughout the NAS. This latter version of the WAAS will be termed the GPS Landing System (GLS).

Mechanism: Wide Area Augmentation System Technology Refresh (WAAS Tech Refresh) [1660]

Elements of WAAS technical refresh consist of two paths. One is improvement to operational capability that enhances performance of WAAS. The other is the known replacement of equipment, including hardware, software, and telecommunications links and networks within the WAAS WMS and GUS.

Technical refresh is subject to "re-baselining" activity that is currently underway and the FAA will make a corporate decision in September 2004.

Domain: Air Traffic Control Surveillance

Cooperative Surveillance

Mechanism: Air Traffic Control Beacon Interrogator - Model 3 (ATCBI-3) [243]

The Air Traffic Control Beacon Interrogator - Model 3 (ATCBI-3) is an air traffic control beacon system that interrogates transponder-equipped aircraft. It provides, through a secondary radar system, interrogation of transponders and reception of aircraft identification and position data. The ATCBI-3 is an air traffic control beacon system that interrogates transponder-equipped aircraft. It provides, through a secondary radar system, interrogation of transponders and reception of aircraft identification and position data.

ATCBI-3s incorporated 1950s tube technology, and all were decommissioned by the late 1990s as a result of Mode S deployments and ATCBI-4/5 relocations.

Mechanism to be deleted from database.

Mechanism: Air Traffic Control Beacon Interrogator - Model 4 (ATCBI-4) [237]

The Air Traffic Control Beacon Interrogator - Model 4 (ATCBI-4) is an air traffic control (ATC) beacon system that interrogates transponder-equipped aircraft. It is a secondary radar system that interrogates transponders, receives aircraft identification, and determines position data.

Mechanism: Air Traffic Control Beacon Interrogator - Model 5 (ATCBI-5) [238]

The Air Traffic Control Beacon Interrogator - Model 5 (ATCBI-5) is an air traffic control (ATC) beacon system that interrogates transponder-equipped aircraft. It is a secondary radar system that interrogates transponders, receives aircraft identification, and determines position data.

Mechanism: Air Traffic Control Beacon Interrogator - Model 6 (ATCBI-6) [301]

The Air Traffic Control Beacon Interrogator Model 6 (ATCBI-6) is a ground-based system that interrogates transponders, receives and processes replies from transponders, determines the range and azimuth to the aircraft, and forwards the information to appropriate air traffic control (ATC) automation systems. Replies provide identification and altitude data of the transponder.

Mechanism: Airport Surveillance Radar - Model 9 / Mode Select (Mode S) All Purpose EUROCONTROL Radar Information

Exchange Upgrade (ASR-9/Mode S ASTERIX Upgrade) [6449]

The ASR-9/Mode S ASTERIX Upgrade provides improved surveillance data interface capabilities to NAS automation systems. This will allow additional data currently available at the radar site to be sent to automation systems for improved tracking and data networking. This upgrade is currently planned to be implemented after the completion of the ASR-9/Mode S SLEP, and will extend through the lifespan of the original SLEP implementation.

This mechanism will be replaced at the end of its life cycle by the New Terminal Surveillance System (for terminal sites) and the New En Route Surveillance System (for en route sites)

Mechanism: Beacon Interrogator, Military (UPX-39) [2446]

The UPX-39 is a new secondary surveillance radar beacon system that will replace the OX-60 secondary (beacon) radars in Alaska (12) and Hawaii (1) at the 13 joint-use (FPS-117 primary radar) facilities to improve the quality, reliability, and availability of radar data used for air traffic control and to reduce FAA and United States Air Force maintenance costs. The FAA will use existing interfaces to provide the radar data to the ARTCCs. The FAA provides technical support and funds its share of the cost associated with the fabrication, installation, and acceptance of 13 systems at the joint-use radar facilities.

Mechanism: Beacon Interrogator, Military (OX-60) [2447]

The OX-60 is a secondary (beacon) system collocated with the 12 joint-use FPS-117 long-range primary radars in Alaska and 1 joint-use FPS-117 in Hawaii. It is used to interrogate transponder-equipped aircraft, receive aircraft identification, determine aircraft position, and forward the information to appropriate U.S. Department of Defense and FAA air traffic control automation systems.

Mechanism: Beacon Interrogator, Military (TPX-42) [6457]

The TPX-42 beacon interrogator is a military analog interrogator (IFF) system used to detect and report the identity and location of aircraft in a specific volume of airspace. It is used in conjunction with the GPN-20 military airport surveillance radar. The TPX-42 is similar to the FAAs ATCBI-4/5.

Mechanism: Digital Airport Surveillance Radar (DASR) [2004]

The Digital Airport Surveillance Radar (DASR) provides advanced digital primary radar including weather intensity surveillance with an integrated mono-pulse Secondary Surveillance Radar (SSR) system for use in the airport terminal area. (Military version of ASR-11)

Mechanism: Mode Select (Mode S) [239]

The Mode Select (Mode S) mechanism is a ground-based system capable of selective interrogation of Mode S transponders and general interrogation of Air Traffic Control Radar Beacon System (ATCRBS) transponders within range. The system also receives, processes, and forwards the transponder replies to appropriate air traffic control (ATC) automation systems. Data formats for both interrogation and reply include data exchange capability.

The system also provides a Traffic Information Services (TIS) function that makes local traffic data available to the flight deck via the Mode S data link. TIS, a Mode S data link service, provides automatic traffic advisories to properly equipped aircraft. Pilots are able to request and receive a display of nearby traffic. The relative range, bearing, and altitude (if known) and a "proximate" or "threat" classification of nearby aircraft will be displayed in the cockpit.

Mechanism: Mode Select En Route (Service Life Extension Program) (Mode S En Route (SLEP)) [1681]

The Mode Select En Route (Service Life Extension Program) Mode S En Route(SLEP)) is a replacement of items that have become uneconomical to maintain or difficult to obtain. The ASTERIX upgrade will not be implemented as part of the SLEP, but will be implemented at a later date (see Mode S En Route ASTERIX Upgrade).

This mechanism has been incorporated into the ASR-9/Mode S SLEP mechanism in its entirety, and should be deleted.

Mechanism: New En Route Surveillance System (New En Route Surveillance System) [640]

The New En Route Surveillance System is a future generation surveillance system capable of providing cooperative surveillance capabilities in the en route environment commensurate with the technology at that time. This system will replace the ATCBI-6 and en route Mode S systems at the end of their life cycles.

Mechanism: New Terminal Surveillance System (New Terminal Surveillance System) [245]

The New Terminal Surveillance System replaces existing terminal radar systems with new radars that incorporates primary and secondary surveillance and doppler weather radar capability.

Since ADS-B may be used in lieu of secondary surveillance at some locations, the New Terminal Radar will include just the primary surveillance and Doppler weather radar capabilities at those locations. The determination of these locations will depend on the outcome of ADS-B investment decisions, as yet TBD.

Mechanism: Precision Runway Monitor (PRM) [244]

The Precision Runway Monitor (PRM) is a secondary radar system, similar to the Mode Select (Mode S), which operates and updates targets at a faster rate than that of the normal Air Traffic Control Radar Beacon System (ATCRBS) or Mode S system. This faster update rate provides improved precision in predicting target positions. The PRM system is utilized to increase efficiency of operations during instrument meteorological conditions (IMC) by allowing independent simultaneous approaches to parallel runways spaced less than 4,300-feet apart. A separate display is located in the TRACON to support these parallel runway operations.

The PRM sensor (secondary radar) will undergo a Service Life Extension at the end of its current service life. The display function will eventually be incorporated into STARS.

Mechanism: Precision Runway Monitor Service Life Extension Program (PRM SLEP) [6409]

The Precision Runway Monitor (PRM) SLEP extends the service life of the PRM sensor (secondary radar system) through at least 2025. The PRM is similar to the Mode Select (Mode S), which operates and updates targets at a faster rate than that of the normal Air Traffic Control Radar Beacon System (ATCRBS) or Mode S system. This faster update rate provides improved precision in predicting target positions. The PRM system is utilized to increase efficiency of operations during instrument meteorological conditions (IMC) by allowing independent simultaneous approaches to parallel runways spaced less than 4,300-feet apart. STARS provides the display function for ATC.

Mechanism: Surveillance Data Network (SDN) [6315]

National Airspace System (NAS) surveillance systems, including radar and automatic dependent surveillance systems will provide surveillance data objects via the Surveillance Data Network (SDN), which is a sub-network of the System Wide Information Management (SWIM) and the FAA Telecommunication Infrastructure (FTI). The published Surveillance Data Objects (SDO) will be made available to NAS and other users, including the Transportation Security Administration, Department of Defense, and others. Surveillance data availability supports 3-mile separation standards, gate-to-gate traffic management, seamless airspace, and dynamic resectorization. Improved surveillance information is provided in a timely and consistent manner seamlessly across the NAS for operations, planning, and decision making. The information will be available to all users and service providers via SDO in near real time. This information enables decisions to be based on a shared common view of situations, even as conditions are changing. Improved surveillance with SDOs will provide the automation higher quality of data for seamless surveillance and, in combination with other capabilities and new procedures, enable capacity and safety improvements. These benefits accrue from increased situation awareness by decision makers and improved operation of decision support and analysis tools that use surveillance information.

Dependent Surveillance

Mechanism: Automatic Dependent Surveillance (Capstone) Ground Station (ADS (Cap) Ground Station) [1408]

The Automatic Dependent Surveillance (Capstone) Ground Station (ADS (Cap) Ground Station) is a demonstration system used by the Capstone project under Safe Flight 21. It receives Global Positioning System (GPS)-derived aircraft four (4)-dimensional position data, aircraft identification, aircraft velocity, and other selected aircraft data for processing at ATC facilities, and transmits Traffic Information System - Broadcast (TIS-B) information on aircraft in areas of radar coverage (and other airspace status information when available) to properly to equipped aircraft, to support operational trials. These ground stations are located in remote locations in Alaska, and feed the Anchorage Air Route Traffic Control Center (ARTCC) automation system.

Mechanism: Automatic Dependent Surveillance (Safe Flight 21) Ground Station (ADS (SF-21) Ground Station) [2412]

The Automatic Dependent Surveillance (Safe Flight 21) Ground Station (ADS (SF-21) Ground Station) is a demonstration system used by the Ohio Valley project under the Safe Flight 21 program. It receives Global Positioning System (GPS)-derived aircraft four (4)-dimensional position data, aircraft identification, aircraft velocity, and other selected aircraft data for processing at selected ATC facilities, and transmits Traffic Information System - Broadcast (TIS-B) information on aircraft in areas of radar coverage (and other airspace status information when available) to properly to equipped aircraft, to support SF-21 operational trials. These ground stations will be located in the regions surrounding Memphis, TN and Louisville, KY, and interface with developmental surveillance processing systems.

Mechanism: BSGS Broadcast Services Ground Station (BSGS) [6313]

The BSGS (Broadcast Services Ground Station) supports Air-Ground broadcast services. This includes the reception of ADS-B from equipped aircraft/vehicles and the transmission of Traffic Information Service-Broadcast (TIS-B) and Flight Information Service-Broadcast (FIS-B) for use by equipped aircraft. Generally, the BSGS will interface via the SDN to provide ADS-B information to ATC automation and receive TIS-B and FIS-B information from TIS-B and FIS-B servers. The BSGS includes antenna(s), one or more dual link (i.e., 1090 MHz Extended Squitter-1090ES and Universal Access Transceiver-UAT) Ground Based Transceiver(s)(GBT), processing functions and communications functions. Several configurations of the BSGS are required to support variations in the geographic service volume and functions to be supported at specific categories of operational sites. BSGSs will be installed at 448 airports and 100 en route locations. Included are those airports equipped with Secondary Surveillance Radar (SSR) and about 140 additional towered airports (currently without SSR). The BSGS will support ADS-B and TIS-B services via both the 1090ES link and by the UAT link. The BSGS will also support FIS-B via the UAT link. BSGSs incorporate a multilink gateway function that provides ADS-B rebroadcasts via the ADS-B alternate link. A BSGS incorporating 2 GBTs are required for airport surface and terminal surveillance coverage at each of 268 smaller airports, a BSGS incorporating 3 GBTs (on average) are required at 120 of the mid-sized airports, and a BSGS incorporating 6 GBTs (on average) are required at the 60 largest airport (those equipped with ASDE-X or ASDE-3 surface surveillance systems).

The following BSGS functions are required to support the various categories of NAS BSGS sites, except as noted below: (1) 1090ES and UAT receive/transmit (i.e., the GBT funnction); (2) multi-link gateway function; (3) process received ADS-B messages and output (via the SDN) ADS-B reports for use by ATC automation; (4) accept TIS-B and FIS-B information from ground TIS-B/FIS-B servers and manage the generation and broadcast of link specific TIS-B messages via the 1090ES and UAT links and FIS-B messages via the UAT link.

The following BSGS configurations are assumed based on the category of the operational site. Except as noted below all BSGS configuration support the above described functions.

En route (100 sites): (1) One multi-sector antenna with each sector connected to the individual 1090ES and UAT receivers. Supports up to 250 nmi. ADS-B reception. En route locations that are intended to provide only low-altitude gap filler coverage do not require the long-range capability. (2) One omni-directional transmit antenna. Transmitter power sized to support the required TIS-B and FIS-B coverage for that specific site.

Terminal/Airport without ASDE-X (415 airports incl. 27 ASDE-3 equipped airports) with each site having: (1) BSGS with at least 2 GBTs with omni-directional antennas sited for both airport surface and terminal airspace coverage; (2) additional GBTs as needed to provide coverage of the primary airport surface movement area.

Terminal/Airport with ASDE-X (26 ASDE-X plus 7 upgraded ASDE-3 airports with an average of 6 GBTs per BSGS): (1) ASDE-X ground stations upgraded to support GBT functionality; (2) At least two of the GBTs provide ADS-B coverage to the edge of the terminal airspace and the TIS-B coverage; (3) ASDE provides the surveillance data source to support TIS-B for surface traffic.

Mechanism: Surface Traffic Information Processor (STIP) [6314]

The STIP would be an extension of the Automatic Dependent Surveillance-Broadcast (ADS-B)/Traffic Information Service - Broadcast (TIS-B) capability at 60 large airports equipped with Airport Surface Detection Equipment (ASDE) Model X or Model 3 systems. A processor would be added at each of these airports to support Traffic Information Service-Broadcast (TIS-B) services for surface and nearby low-altitude traffic. The STIP will receive surveillance information from the ASDE-X or ASDE-3 system and generate TIS-B messages for delivery by the Broadcast Services Ground Stations (BSGSs) providing surface coverage at that airport. The STIP will support of subset of the functionality of the TIS-FIS Broadcast Server (that is intended to support TIS-B for airborne users), but the STIP will support a more real-time TIS-B service with a higher update rates and lower latency consistent with the available surface surveillance data source and the needs to support surface movement operations.

Mechanism: TIS-FIS Broadcast Server (TIS-FIS) [6319]

TIS-FIS Broadcast Servers are located at 22 Air Route Traffic Control Centers and 8 consolidated Terminal Radar Approach Controls/Integrated Control Complex (ICC). TIS-Broadcast (TIS-B) is needed unless full Automatic Dependent Surveillance-Broadcast equipage is achieved. Servers will receive surveillance data (i.e., based on Secondary Surveillance Radar, etc.), from the Surveillance Data Processor (SDP), in the form of Surveillance Data Objects for each target aircraft and will create TIS-B reports. Servers will receive FIS data from weather processors. The TIS and FIS data will be geographically filtered for the defined service volume of each Broadcast Services Ground Station (BSGS), and TIS data will also be filtered for only non-ADS-B-equipped targets.

Independent Surveillance

Mechanism: Air Route Surveillance Radar - Model 1E (ARSR-1E) [240]

The Air Route Surveillance Radar - Model 1E (ARSR-1E) is a 1970s analog radar. It is a long-range radar system with a maximum detection range of 200 nm. The ARSR-1E is a surveillance system used to detect azimuth and slant range of en route aircraft operating between terminal areas. It also provides weather intensity data.

Mechanism: Air Route Surveillance Radar - Model 2 (ARSR-2) [241]

The Air Route Surveillance Radar - Model 2 (ARSR-2) is a 1970s analog radar. It is a long-range radar system with a maximum detection range of 200 nm. The ARSR-2 is a surveillance system used to detect azimuth and slant range of en route aircraft operating between terminal areas. It also provides weather intensity data.

Mechanism: Air Route Surveillance Radar - Model 3 (ARSR-3) [229]

The Air Route Surveillance Radar - Model 3 (ARSR-3) is a 1980s radar that provides primary long range surveillance data, including slant range and azimuth data. It processes the returns which includes demodulation, analog-to-digital conversion, moving target indicator function, sensitivity time control, range and azimuth gating, and digital target extraction - all of which are performed digitally (with the exception of the demodulation and analog-to-digital conversion). In addition, the ARSR-3 has a weather channel with associated processing to provide weather contour information in digital format.

Mechanism: Air Route Surveillance Radar - Model 4 (ARSR-4) [230]

The Air Route Surveillance Radar - Model 4 (ARSR-4) is a three-dimensional, long-range, rotating phased array, primary surveillance radar with integrated height finder capability. It is part of the joint surveillance system (JSS) used in conjunction with ARSR-3 coverage as part of the nationwide air defense command surveillance network. In addition to functions peculiar to the military, the ARSR-4 performs the same basic functions of the ARSR-3, by providing primary long-range surveillance data, including slant range and azimuth data.

Mechanism: Airport Surface Detection Equipment - Model 3 (ASDE-3) [232]

Airport Surface Detection Equipment - Model 3 (ASDE-3) provides primary radar surveillance of aircraft and airport service vehicles on the surface movement area. ASDE-3 is installed at the busiest U.S. airports. Radar monitoring of airport surface operations (ground movements of aircraft and other supporting vehicles) provides an effective means of directing and moving surface traffic. This is especially important during periods of low visibility such as rain, fog, and night operations.

The ASDE-3 will undergo a SLEP to extend its service life through 2015 (see ASDE-3 SLEP), which will enable it to more effectively support AMASS (see) through this same time period.

Mechanism: Airport Surface Detection Equipment - Model 3 Service Life Extension Program (ASDE-3 SLEP) [1684]

Airport Surface Detection Equipment - Model 3 Service Life Extension Program (ASDE-3 SLEP) provides for the technical refresh of the ASDE-3. The following components will be replaced or upgraded: antenna azimuth encoders, transmitter power supply modulators, digital processing circuit cards, display units, and other obsolete parts. The SLEP will extend the life of the ASDE-3 through 2015, which will allow it to support AMASS more effectively.

Future tech refreshes of the ASDE-3 will be included as part of the ASDE-3/AMASS Upgrade activity.

Mechanism: Airport Surface Detection Equipment - Model 3 Workstation (ASDE-3 Workstation) [2369]

Airport Surface Detection Equipment - Model 3 Workstation (ASDE-3 Workstation) displays ASDE-3 primary surveillance of aircraft and vehicles on the airport surface. The workstation is part of the ASDE-3 system; therefore, locations and schedules are identical to ASDE-3.

Mechanism: Airport Surface Detection Equipment - Model 3/Airport Movement Area Safety System Upgrade (ASDE-3/AMASS Upgrade) [6368]

Airport Surface Detection Equipment - Model 3/Airport Movement Area Safety System Upgrade provides for the technical refresh of the ASDE-3 and AMASS. Selected system components will be replaced or upgraded to extend the life cycle of these systems through 2023 (ASDE-X EOSL), at which point all ASDE systems (ASDE-3/AMASS, ASDE-3X, ASDE-X) will be replaced with a common system.

Mechanism: Airport Surface Detection Equipment - Model 3X (ASDE-3X) [2468]

Airport Surface Detection Equipment - Model 3X mechanism will add the functionality of ASDE-X to seven initially identified ASDE-3 sites. These seven ASDE-3 sites will have common functionality represented by the ATC graphical user interface, the keyboard, the trackball, and the displays. The ASDE-3X will be a modular surface surveillance system capable of processing radar, multilateration, fusion, and Automatic Dependent Surveillance-Broadcast (ADS-B) sensor data for seamless airport surface surveillance to air traffic controllers.

The remaining 25 ASDE-3 sites will also be upgraded in the same fashion, based on the outcome of a future investment decision (TBD).

Mechanism: Airport Surface Detection Equipment Model X (ASDE-X) [820]

The Airport Surface Detection Equipment Model X (ASDE-X) consists of a primary radar subsystem, multilateration subsystem, data fusion subsystem, and a display. ASDE-X will detect, identify and track targets; project target paths, and alert controllers to possible conflicts. Interfaces with other Air Traffic Control (ATC) automation systems will provide arrival aircraft data tag including position, and aircraft identification, and predicted runway information.

Mechanism: Airport Surveillance Radar - Model 11 (ASR-11) [233]

The Airport Surveillance Radar- Model 11 (ASR-11) is a digital, combined primary and secondary surveillance radar (SSR), short-range radar system with a 60 nautical mile (nmi) detection range for medium and small activity airports. The ASR-11 provides advanced digital primary radar including weather intensity surveillance with an integrated monopulse SSR system for use in the airport terminal area. The ASR-11 is used to detect and report the presence and location of an aircraft in a specific volume of airspace. The ASR-11 provides search radar surveillance coverage in controlled airspace primarily in terminal areas.

Mechanism: Airport Surveillance Radar - Model 7 (ASR-7) [234]

The Airport Surveillance Radar - Model 7 (ASR-7) is a short-range (60 nm) analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. It is used in conjunction with the Air Traffic Control Beacon Interrogator - Model 4 or Model 5 (ATCBI-4 or ATCBI-5) or Mode S. This system will be replaced by the ASR-11.

Mechanism: Airport Surveillance Radar - Model 8 (ASR-8) [235]

The Airport Surveillance Radar - Model 8 (ASR-8) is a short-range (60 nm), analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. It is used in conjunction with the Air Traffic Control Beacon Interrogator - Model 4 or Model 5 (ATCBI-4 or ATCBI-5) or Mode S.

Mechanism: Airport Surveillance Radar - Model 9 (ASR-9) [236]

The Airport Surveillance Radar - Model 9 (ASR-9) is a short range (60 nm) radar system for the airport terminal area. The ASR-9 processes the returns from aircraft targets, which includes demodulation, analog-to-digital conversion, range and azimuth gating, sensitivity timing control, and a moving target detection function. The moving target detector includes two-level weather contour processing, digital signal processing, correlation and interpolation processing, and surveillance processing. The ASR-9 has a separate weather channel with associated processing capable of providing six-level weather contours. The two-level weather contour processing associated with the moving target detector is only be used for backup. The six-level weather channel is primarily used to supplement Next Generation Weather Radar (NEXRAD) coverage. It is normally used in conjunction with Mode Select (Mode S) but it can accommodate an Air Traffic Control Beacon Interrogator Model 4/5 (ATCBI-4/5).

The ASR-9 will be upgraded/replaced with the ASR-9/Mode S SLEP (see separate mechanism) in the 2007-12 time frame.

Mechanism: Airport Surveillance Radar - Model 9 and Mode Select (Service Life Extension Program) (ASR-9/Mode S (SLEP)) [1683]

The Airport Surveillance Radar - Model 9 and Mode Select (Service Life Extension Program) (ASR-9/Mode S (SLEP)) mechanism provide the necessary technical refresh to extend the service life of the ASR-9 and Mode S through 2030. The ASTERIX upgrade will not been implemented as part of this SLEP, but will be implemented at a later date (see ASR-9/Mode S ASTERIX Upgrade).

Mechanism: Airport Surveillance Radar, Military (GPN-20) [2028]

The GPN-20 radar is a military short-range (60 nm) analog radar system used to detect and report the presence and location of aircraft in a specific volume of airspace. It is used in conjunction with the TPX-42 military beacon (interrogate friend or foe, IFF). The GPN-20 is the military version of the FAAs ASR-7/8.

Mechanism: Fixed Position Surveillance - Model 117 (FPS-117) [557]

The Fixed Position Surveillance - Model 117 (FPS-117) radar is a joint-use military surveillance system used by the FAA to detect slant range and azimuth of en route aircraft. These radars are located in Alaska (12) and Hawaii (1), and are expected to be sustained until at least 2020.

Mechanism: Fixed Position Surveillance Model 20 Series (FPS-20 Series) [242]

The Fixed Position Surveillance Model 20 Series (FPS-20 Series) is a military primary radar of various models (FPS-20A, FPS-64, FPS-66A, FPS-67/A/B, and ARSR-60M) used by the FAA to detect slant range and azimuth of en route aircraft operating between terminals in the continental United States. Each of the different radar models is a similar variation of the original FPS-20 military radar.

Mechanism: Height Monitor Unit (HMU) [2377]

Continue developing 3rd and final set of simulations including interface with Mexico and Canada. Develop required modifications to NAS enroute systems. Finalize Procedures, complete simulations, and begin implementation. Refine program, and complete implemention nationwide. Continue program maintenance and modeling of enhancements.

Data Last Updated On: 06-Oct-2004
Page Formatting Last Updated On:06-Jul-2004

For further information, please contact:

Diana Liang 202-385-7254